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ABSTRACT

What is the actual distribution of federal financial aid funds across states to students with different characteristics attending various types of institutions? This document presents an effective means of organizing these extensive data in a way that is useful for evaluating the distribution of current federal programs and for estimating changes in the aid distribution likely to result from student aid program modifications. The simulated model described is designed as an exploratory tool for examining the sensitivity of student aid distributions to alternative student aid program specifications. It also presents four analyses of specific federal student aid program modifications and the likely change that would result in the distribution of aid across states and institutional and family income categories. (Author/KE)

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A FLOW OF FUNDS MODEL FOR ASSESSING THE IMPACT OF ALTERNATIVE STUDENT AID PROGRAMS

Research Memorandum
EPRC 2158-28

Prepared for:

OFFICE OF THE
ASSISTANT SECRETARY FOR EDUCATION
DEPARTMENT OF HEALTH, EDUCATION
AND WELFARE
WASHINGTON, D.C. 20202

CONTRACT OEC-0-72-5016

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STANFORD RESEARCH INSTITUTE
Menlo Park, California 94025 · U.S.A.

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Educational Policy Research Center

DARYL E. CARLSON

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SUMMARY

Until recently, few data have been available to describe the actual distribution of federal financial aid funds across states to students with different characteristics attending various types of institutions. With the availability of disaggregated data for the fiscal year 1972-73, it has been possible, for the first time, to examine in detail the distribution of federal student aid program dollars. The purpose of the simulation model presented in this report is to provide an effective means of organizing these extensive data in a way that is useful for evaluating the distribution of current federal programs and for estimating changes in the aid distribution likely to result from student aid program modifications.

The simulation model described in this report is designed as an exploratory tool for examining the sensitivity of student aid distributions to alternative student aid program specifications. As is usually the case, a major utility of such models is the understanding of the complexities of the system being modeled that is gained during the process of developing the model. Model building for postsecondary education is extremely primitive at this time, and any such model is developed around a large number of assumptions. For these reasons, this report describes the many aspects of the postsecondary education system that were analyzed as having an effect on the distribution of federal student aid, and indicates the types of assumptions that had to be made.

In addition to the description of the elements of the postsecondary education system included in the simulation model, this report presents four analyses of specific federal student aid program modifications and the likely change that would result in the distribution of aid across

states and institutional and family income categories. These analyses illustrate the usefulness of such a model as a means of effectively organizing the massive amount of data available for policy analysis purposes.

From the experience gained during the development and use of the simulation model, four conclusions were reached that should be highlighted before the discussion of the model and the student aid program analyses. First, disaggregation of the data and analysis by state is an extremely important and necessary component of federal student aid program analyses. Many of the dimensions of student aid programs are of such a nature that when applied only to national aggregate data, the results and policy implications can be very misleading. This conclusion is very clearly illustrated with the policy analyses described later in this report.

Second, distributions of federal student aid program dollars generated on the basis of the intent of the law (as interpreted from the legislation) differ significantly from the actual distributions of these funds across states and across institutional and income categories. This observation suggests that student aid simulation techniques based on legal descriptions of the aid programs must be carefully validated with actual distribution data. Many institutional and student behavioral factors significantly influence the distribution of student aid but cannot be estimated very well with currently available data. At least the *net* effect of all these institutional and student factors can be measured for the first time with the data base constructed for this study.

Third, with the data now available and with the analytical tools developed, incremental changes to present institutional-based federal student aid programs can be evaluated with a significant degree of confidence. Moreover, with the level of detail in the analysis, even program specifications that are quite different from existing institutional-based programs can be evaluated with a high degree of confidence, since many of the program components are similar to components of current and past programs.

Fourth, as more data become available and as more research is done, many of the factors in this model that are currently based on assumption can then be based on more specific information. Also policy issues change over time, so that the structure of the model will need to be modified. Therefore, this type of model will undergo continual revision and possibly even an overall change in structure. Only through such change and the incorporation of new data can such models be of use for policy analysis.

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PREFACE

This flow of funds model has been developed in response to a series of student aid policy questions posed by the Office of the Deputy Assistant Secretary for Education (Policy Development) in the Department of Health, Education, and Welfare. The main policy report from the research effort is titled *Student Aid: Description and Options* by John Lee, Daryl Carlson, Jerry Davis, and Ann Hershberger. In that volume a student aid policy evaluation model is described which utilizes the simulation model developed in this report to provide estimates of student aid distributions for alternative student aid programs.

The author of this report is an assistant professor in the Department of Agricultural Economics, University of California, Davis, California.

I DESIGN OF THE MODEL

The Conceptual Framework

The current system of financial assistance for students attending institutions of higher education is extremely complex. Five Office of Education programs,[*] two other major federal programs,[†] and a large number of state student aid programs[‡] provide funds to college students. In addition, colleges and universities use substantial amounts of their own resources to assist students financially.[§] Each of these programs has been designed to aid certain categories of individuals in pursuing their college education. The success or failure of these student aid programs is still largely undetermined, although several interesting evaluation studies have been undertaken.[□]

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[*] Basic Educational Opportunity Grants (BEOG), Supplemental Educational Opportunity Grants (SEOG), College Work Study (CWS), National Direct Student Loans (NDSL), and Guaranteed Student Loans (GSL).

[†] The G.I. Bill provided $2.6 billion of student aid during 1974-75, and Social Security benefits provided $856 million for student assistance.

[‡] During 1974-75, there was a total of 62 student aid programs in 38 states as reported in the annual survey of the National Association of State Scholarship Programs.

[§] As calculated from the 1972-73 *Fiscal Operation's Reports* of the Office of Education, DHEW, institutions used over $1 billion of their own funds for student aid.

[□] N. Friedman, "The Federal Educational Opportunity Grant Program: A Status Report, Fiscal Year 1970," Bureau of Applied Social Research, Columbia University, 1971; N. Friedman, L. Sanders, and J. Thompson, "The Federal College Work-Study Program: A Status Report, Fiscal Year 1971," Bureau of Applied Social Research, Columbia University, 1973; "National Survey of Institutions Participating in the NDSL Program," Educational Testing Service, 1974.

Although the distribution process for student aid funds is extremely complicated, it should be fairly easy to determine how the aid dollars are distributed since legislation for the programs provides several rules, regulations, and guidelines for awarding financial aid. However, the actual distributions are greatly influenced by the behavior of students and various individuals within the colleges and universities.

The basic approach for this analysis has been to develop a simulation model that describes the actual student aid distribution process as closely as possible, given currently available data and limited understanding of the behavioral factors involved. Although simulation models for policy analysis have been criticized,* they can be a useful means of piecing together, as quantitatively as possible, many of the complex interrelationships involved in the distribution of student aid. The simulation model developed here is designed to calculate the distribution of federal student aid dollars by state, type of institution, and family income categories for alternative specifications of the student aid programs. The simulation model has been structured so that many of the assumptions that have to be made can be easily changed, and so that the calculations can be revised on a different set of underlying assumptions. Two levels of modifications can be made of the assumptions built into the model. The first level is easily done through the input parameters of the model. These parameters are described in detail at the end of this chapter and require no special programming skills. The second level requires that changes be made in the computer program. Given the structure of the program, even these changes are fairly easy to make.

The simulation model is based on the assumptions that student aid is distributed largely on the basis of financial need, and that student and institutional preferences strongly influence the actual aid distributions. Financial need is a difficult concept to define, and many alternatives can be used within the structure of the simulation model. All the major components of the student aid distribution process are described in detail in this report: student financial need, financial aid officer preferences, institutional competition for student aid funds, student responses and aid preferences, legislative regulations for student aid programs, and state distribution procedures.

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*S. P. Dresch, "A Critique of Planning Models for Postsecondary Education," Journal of Higher Education, Vol. XLVI, No. 1, May/June 1975, pp. 245-286.

The design of the model is based on full-time equivalent (FTE) undergraduate, degree-credit enrollment disaggregated by family income categories, institutional categories, and states for fiscal year 1972-73. This year is currently the only one for which the most complete set of data can be assembled. Although FTE enrollment is most likely the best enrollment number to use since part-time students are eligible for most student aid programs on a reduced amount basis (to reflect their lower cost of attendance), the model is constructed so that full-time, part-time or headcount undergraduate, degree-credit enrollment can also be used as a base.

For the purposes of distributing student aid, dependent and independent students (defined in Chapter III) need to be treated differently. However, the numbers and characteristics of independent students are not well known with present data sources, especially with respect to their student aid eligibility. The simulation model is designed with three options with respect to independent students. First, the independent students may be categorized across family income levels according to their gross financial need and then added with the dependent students. Second, the independent students may be categorized across family income levels in the same proportions as dependent students. Third, the independent students may be left out of the analysis.

Since the postsecondary education environment is extremely diverse across the 50 states, the model has been developed so that analyses can be run on all states individually, on only one or selected states, or on national aggregate data. State differences can be illustrated in a number of ways: percentage of young adults enrolled in higher education; mix of institutions providing educational services; cost of attending college; existence, size, and type of state student aid programs available; demographic and economic characteristics of the population; high school graduation rates; and admission and student aid policies of the institutions. Given such a diversity of factors, federal student aid programs are likely to have different impacts in each of the states.

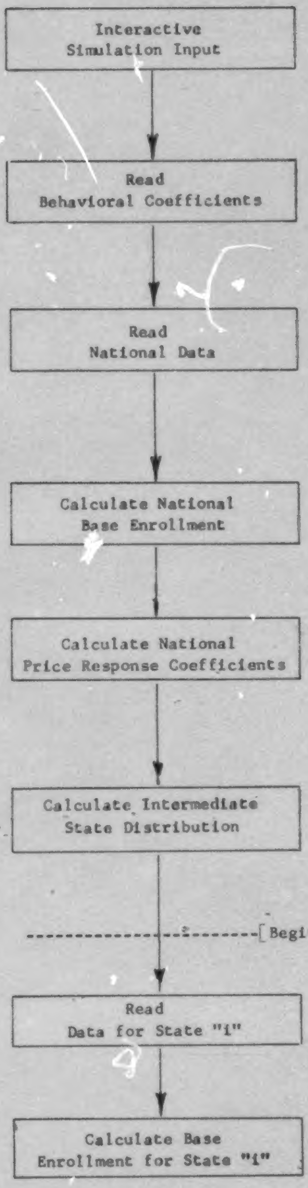
As a means of outlining the overall structure of the simulation model, Figure 1 presents a flow chart of the basic components in the model with a brief description of each block.

Measures of Student Financial Need

Although all federal student aid programs are intended to assist students with financial need, it is not clear how financial need should be defined and measured to distribute the federal aid. For the purposes of this study, the basic definition of financial need is:

Gross financial need per student equals Total cost of attendance
minus
Expected parental contribution
minus
Student self-help

Total cost of attendance reflects the 9-month budget for tuition and fees, books, supplies, and living expenses for an in-state resident


Interactive Simulation Input
Read Behavioral Coefficients
Read National Data
Calculate National Base Enrollment
Calculate National Price Response Coefficients
Calculate Intermediate State Distribution
[Begin loop over states]
Read Data for State "i"
Calculate Base Enrollment for State "i"

All the student aid program specifications as well as many of the behavioral assumptions built into the simulation model are inputted through a question-and-answer procedure on a time-share terminal (Chapter I).

The basic student price response coefficients used in the model are from the Radner-Miller study[*] and from a recent analysis by Carlson.[†] These coefficients are used in the calculations described in Chapter III.

All the enrollment, student aid, and institutional data by state are aggregated at the national level. Simulations can be run for either the nation as a whole or for individual states (Chapter II describes the data base).

Data are available by type of institution for dependent students by family income categories and for independent students by their own income categories. Alternative procedures for including or excluding independent students are built into the model (Chapter III).

Utilizing the behavioral coefficients read in above and the enrollment probabilities from the national data, the price response coefficients for tuition changes, grants, loan, and work study aid can be calculated (Chapter III).

Since many federal student aid programs have an intermediate distribution to states before allocations are made to institutions and the students, a procedure has been included into the model to determine these distributions on the basis of several formulas (Chapter III).

All the enrollment, student aid, and institutional data are in the data base (Chapter II) for each state.

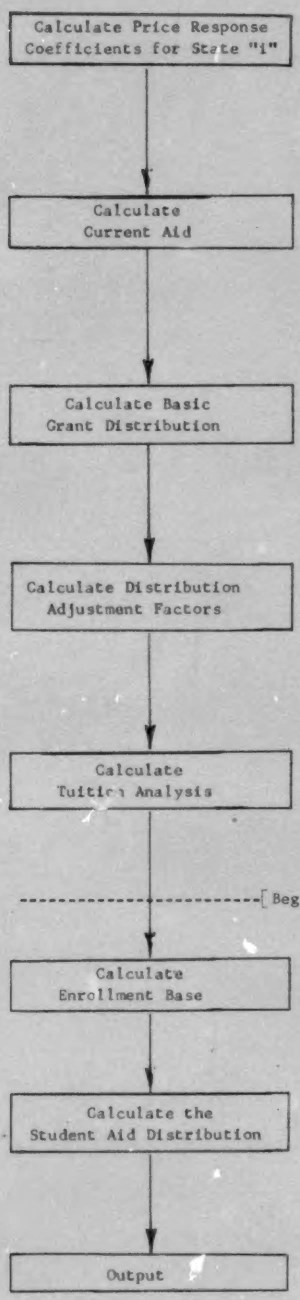
Data are available by type of institution for dependent and independent students for each state. Alternative procedures for including or excluding independent students are built into the model (Chapter III).

---

[*] Radner, R., and L. Miller, "Demand and Supply in U.S. Higher Education: A Progress Report," American Economic Review, May 1970.

[†] Carlson, D., "Student Price Response Coefficients for Grants, Loans, Work-Study Aid, and Tuition Changes: An Analysis of Student Surveys," unpublished manuscript, Department of Agricultural Economics, Univ. of Calif. Davis, November 1974.

FIGURE 1 ANNOTATED FLOW CHART OF THE SIMULATION MODEL


Calculate Price Response Coefficients for State "i"
Calculate Current Aid
Calculate Basic Grant Distribution
Calculate Distribution Adjustment Factors
Calculate Tuition Analysis
[Begin loop over aid package]
Calculate Enrollment Base
Calculate the Student Aid Distribution
Output

Utilizing the behavioral coefficients read in above and the enrollment probabilities from the data for state "i," the price response coefficients for tuition changes, grants, loans, and work study can be calculated (Chapter III).

For calculating financial need as a base to distribute student aid, it is necessary to include alternative specifications of aid currently available by type of institution and parental income category. The model is developed to allow for alternative sets of aid programs to be included in the calculation of financial need (Chapter III).

Since the basic grant (BEOG) program is administered in a much different way than the three institutional-based programs (SEOG, NDSL, and CWS), a separate procedure is built into the model for simulating the distribution of this grant program (Chapter III).

Financial aid officer preferences and institutional competition for aid funds exert significant influence on the resulting distribution of student aid. Adjustment factors are calculated from the extensive information in the data base. The details of the adjustment factors are described in Chapter III.

Tuition policies by institutions and states have several direct and indirect effects on student aid distributions. To analyze these effects, procedures have been included into the model to assess the simultaneous impact of tuition and student aid policies (Chapter IV).

Depending on the specification of the aid program, the base enrollment will be full-time, part-time, FTE, or headcount enrollment.

Utilizing all of the information from the previous steps in the analysis, student aid is distributed across states, institutional categories, and parental income categories. The analytical procedure for this distribution process is described in Chapter V.

Several summary tables as well as more detailed results of the simulation are printed out after all of the calculations have been completed. The state and aid package loops end here.

FIGURE 1 ANNOTATED FLOW CHART OF THE SIMULATION MODEL (Concluded)

student. The estimated costs of attendance shown in Table 1 from the Tripartite Applications as reported by financial aid officers are consistently higher than the estimates reported by the College Scholarship Service. It is conceivable that the Tripartite Application estimates

Table 1

NATIONAL AVERAGES OF TOTAL COST OF ATTENDANCE
1972-1973

Institutional Sector	Dependent Students Tripartite*	Dependent Students CSS†	Independent Students*
Public 4-year	$2,580	$1,985	$3,348
Public 2-year	2,177	1,635	3,277
Private 4-year	4,018	3,280	4,975
Private 2-year	2,966	2,540	4,119

Sources: *Tripartite student aid application data for 1972-73.

†J. Allan and E. Suchar, "Student Expenses at Postsecondary Institutions, 1972-73," College Scholarship Service of the College Entrance Examination Board.

are biased upwards because the aid officers are trying to obtain as much aid as possible. However, since these estimates are used by the Office of Education in awarding aid funds, these attendance cost estimates are used in this study. The higher cost of attendance for independent students primarily reflects the fact that a much higher percentage of independent students are married, and therefore their cost of living is substantially higher. The variation in total costs of attendance is also very large across states for each of the categories of institutions. The average total cost of attendance and the average tuition are shown for public institutions in Table 2 and for private institutions in Table 3. The range of total costs of attendance for public four-year institutions is from $1,962 (Louisiana) to $3,320 (Wyoming). The range for public two-year colleges is from $1,245 (Rhode Island) to $2,925 (Alaska). For private four-year colleges and universities, the range is $2,423 (Arkansas) to $6,973 (Alaska). The range for private two-year colleges is $1,075 (Arkansas) to $3,655 (Connecticut).

A multitude of expected parental contribution schedules have been proposed and used by various groups. Four schedules are illustrated in Table 4. Since the objective of this study is to examine the distribution of federal student aid programs, the parental contribution schedules suggested by the Office of Education (OE) are used as a base in the analysis. Compared with the ACT and CSS schedules, the OE schedule places a higher burden on the lowest income families ($0-$6,000) and a lesser burden on the low-middle ($6,000-$9,000) and middle ($9,000-$12,000) income families. It should be obvious that the level and "slope" of these contribution schedules are a very major determinant of gross financial need. As illustrated in more detail in later sections, the specification of the expected parental contribution schedules for a particular student aid program is one of the policy parameters available to the federal government for directing the distribution of student aid in desired ways. The simulation model has been developed so that alternative expected parental contribution schedules can be specified for any run of the model. This feature makes it possible to determine the expected impacts with respect to the distribution of aid across state and institutional and income categories resulting from alternative contribution schedule specifications.

Obviously, the expected parental contribution schedules described above apply only to dependent undergraduate students. The procedure for

Table 2

TOTAL COST OF ATTENDANCE AND TUITION LEVELS FOR PUBLIC INSTITUTIONS BY STATE
1972-1973

State	Public 4-Year		Public 2-Year	
	Total Cost	Tuition	Total Cost	Tuition
Alabama	$2,548	$491	$1,662*	$206
Alaska	3,314	472	2,925	320
Arizona	2,725	358	1,869	432
Arkansas	2,040	411	1,615*	281
California	2,985	294	2,218*	36
Colorado	2,684	485	2,228*	280
Connecticut	2,492	598	2,174*	292
Delaware	2,283	507	1,876*	392
District of Columbia	2,623	113	2,395	90
Florida	2,828	564	2,011*	259
Georgia	2,449	479	2,317	323
Hawaii	2,304	223	1,761*	50
Idaho	2,455	365	2,349	444
Illinois	2,786	606	2,451	962
Indiana	2,767	645	2,325	408
Iowa	2,579	608	2,126*	433
Kansas	2,425	485	1,786*	316
Kentucky	2,017	514	---	---
Louisiana	1,962	301	1,599*	208
Maine	2,700	492	2,745	370
Maryland	2,629	645	2,158*	667
Massachusetts	2,329	395	2,359	358
Michigan	2,808	632	2,352	542
Minnesota	2,601	601	2,200*	377
Mississippi	2,181*	469	1,316*	233
Missouri	2,348	429	1,992*	863

Table 2 (concluded)

State	Public 4-Year		Public 2-Year	
	Total Cost	Tuition	Total Cost	Tuition
Montana	$2,522	$463	$1,893*	$276
Nebraska	2,443	457	1,804*	282
Nevada	2,709	524	1,806*	320
New Hampshire	3,098	902	1,851*	320
New Jersey	2,587	612	2,239*	580
New Mexico	2,301	436	2,095*	457
New York	3,081	672	2,236*	567
North Carolina	2,432	455	1,824*	129
North Dakota	2,139*	434	1,763*	413
Ohio	2,368	770	1,935*	588
Oklahoma	2,391	397	2,011*	275
Oregon	3,049	528	2,478	362
Pennsylvania	2,418	817	2,453	781
Rhode Island	2,723	666	1,245*	320
South Carolina	2,608	581	2,107*	283
South Dakota	2,158*	590	---	---
Tennessee	2,327	372	1,729*	174
Texas	2,284	285	1,924*	241
Utah	2,805	453	2,347	323
Vermont	3,315	1,014	2,627	820
Virginia	2,432	592	2,339	229
Washington	2,736	539	2,244*	244
West Virginia	2,145*	291	1,802*	245
Wisconsin	2,878	564	2,396	425
Wyoming	3,320	430	2,035*	264

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*Denotes states where half cost is the effective maximum for BEOG awards (used for illustration in Chapter VI).

Source: Tripartite student aid application data for 1972-73.

Table 3

TOTAL COST OF ATTENDANCE AND TUITION LEVELS FOR PRIVATE INSTITUTIONS BY STATE 1972-1973

	Private 4-Year		Private 2-Year	
	Total Cost	Tuition	Total Cost	Tuition
Alabama	$2,947	$1,194	$2,504	$1,228
Alaska	6,973	2,150	2,912	1,400
Arizona	3,930	1,594	1,740	465
Arkansas	2,423	1,813	1,075	762
California	4,726	2,281	3,097	1,194
Colorado	4,392	2,552	0	0
Connecticut	4,181	2,417	3,655	2,006
Delaware	0	0	3,308	1,682
District of Columbia	4,433	2,083	3,350	1,600
Florida	4,094	2,083	3,080	1,372
Georgia	3,713	1,807	2,275	773
Hawaii	3,710	1,178	0	0
Idaho	3,370	1,803	0	0
Illinois	4,120	2,147	4,477	1,419
Indiana	3,479	1,964	2,170	1,251
Iowa	3,553	2,047	2,556	1,094
Kansas	2,909	1,462	2,502	947
Kentucky	2,771	1,277	2,257	1,025
Louisiana	3,757	1,902	0	0
Maine	4,175	2,360	1,883	1,300
Maryland	3,967	2,068	3,181	1,492
Massachusetts	4,634	2,666	3,606	1,795
Michigan	3,285	1,648	2,696	1,317
Minnesota	3,445	1,978	3,138	1,502
Mississippi	2,603	1,252	2,023	820
Missouri	3,805	2,011	3,194	1,479
Montana	2,702	1,382	0	0
Nebraska	3,199	1,619	2,023	1,094
Nevada	2,850	1,200	0	0
New Hampshire	4,555	2,617	2,903	1,424
New Jersey	3,864	2,104	2,824	1,484

Table 3 (concluded)

	Private 4-Year		Private 2-Year	
	Total Cost	Tuition	Total Cost	Tuition
New Mexico	$3,026	1,255	0	0
New York	4,395	2,454	3,394	1,700
North Carolina	3,469	1,800	2,408	1,050
North Dakota	2,500	1,273	0	0
Ohio	3,853	2,162	2,864	1,184
Oklahoma	3,487	1,019	2,494	733
Oregon	3,835	1,997	2,570	1,174
Pennsylvania	4,102	2,352	2,791	1,635
Rhode Island	4,607	2,670	0	0
South Carolina	3,009	1,441	2,186	818
South Dakota	3,169	1,682	2,668	1,016
Tennessee	3,342	1,649	2,267	956
Texas	3,422	1,543	2,344	940
Utah	3,160	618	3,604	800
Vermont	4,095	2,837	4,092	2,156
Virginia	3,389	1,957	3,034	1,507
Washington	3,616	1,879	0	0
West Virginia	3,103	1,613	1,769	836
Wisconsin	3,510	1,967	2,431	1,170
Wyoming	0	0	0	0

Source: Tripartite student aid application data for 1972-73.

Table 4

AVERAGE EXPECTED PARENTAL CONTRIBUTIONS BY FAMILY INCOME CATEGORIES

Income Category	Institutional Category*	Office of Education (1974-75)	Task Force (1975-76)	ACT (1972-73)	CSS (1972-73)
$0-6,000	All	$ 270	$ 0	$ -320	$ -370
6,000-9,000	All	410	172	430	441
9,000-12,000	All	515	802	1,025	1,007
12,000+	Public 4-year	2,250	1,926	2,390	2,401
12,000+	Public 2-year	2,125	1,792	2,257	2,268
12,000+	Private 4-year	2,384	2,071	2,532	2,544
12,000+	Private 2-year	2,250	1,926	2,390	2,401

---

*The $12,000+ income category is broken down by institutional type since the distribution of students in this "open-ended" income category is different for each of the institutional categories.

Source: National Task Force on Student Aid Problems, draft report, March 1975.

determining the "ability to pay" for independent students is much less understood and more difficult to develop in the model. A later section in this report (Chapter III) on the alternative procedures for dealing with independent students provides more information on this aspect of of the student aid distribution process.

In the determination of a dependent student's ability to pay for his college education, an amount of "self-help" must also be included. To a large extent, self-help represents summer earnings. Throughout this study, an estimate of $500 per dependent student for self-help is used for all family income and institutional categories.

The procedure for calculating gross financial need is outlined in Table 5 for each of the institutional and income categories. The expected parental contribution plus the student earnings (self-help) exceed the total student budget for the students from families with incomes exceeding $12,000 who attend public 4-year or 2-year institutions. Therefore, their gross need is negative. The total gross financial need ($5.86 billion) does not include these negative numbers. It is assumed that the need of these students is simply zero.

Given the interest in, and the practice of, packaging student aid for students, it is useful to distinguish between gross financial need and net financial need.

Net financial need per student equals Gross financial need per student

minus

Student aid per student

The difficulty of defining and calculating net financial need is that for specific uses of this measure of need, alternative combinations of current aid programs should be subtracted from gross financial need

Table 5

CALCULATION OF GROSS FINANCIAL NEED

Institutional Category	Family Income Category	Total Student Budget*	Minus	Expected Parental Contribution†	Minus	Student Earnings	Equals	Gross Need per Student	Times	FTE Undergraduate Enrollment‡	Equals	Total Gross Need (millions of dollars)
Public 4-year	$0-6,000	$2,580		$ 270		$500		$1,810		489,717		836.4
	6,000- 9,000	2,580		410		500		1,670		489,578		817.6
	9,000-12,000	2,580		515		500		1,565		501,709		785.2
	12,000+	2,580		2,250		500		-170		896,907		-152.7
Public 2-year	$0-6,000	2,177		270		500		1,407		203,767		286.7
	6,000- 9,000	2,177		410		500		1,267		203,217		257.5
	9,000-12,000	2,177		515		500		1,162		163,142		189.6
	12,000+	2,177		2,384		500		-448		182,331		-81.7
Private 4-year	$0-6,000	4,018		270		500		3,248		183,572		596.2
	6,000- 9,000	4,018		410		500		3,108		196,467		610.6
	9,000-12,000	4,018		515		500		3,003		220,666		662.7
	12,000+	4,018		2,384		500		1,134		581,002		658.9
Private 2-year	$0-6,000	2,966		270		500		2,196		17,535		38.5
	6,000- 9,000	2,966		410		500		2,056		17,316		35.6
	9,000-12,000	2,966		515		500		1,951		15,853		30.9
	12,000+	2,966		2,250		500		216		22,941		4.9
										4,385,720		5,861.3

Sources: *Tripartite student aid application data, 1972-73.

†National Task Force on Student Aid Problems, March 1975.

‡NCES, Opening Fall Enrollment, 1972, and Tripartite student aid application data.

while other programs should nct. Net financial need is not meant to be synonymous with current financial need. Net financial need would be equal to current need only if all current available student aid were subtracted from gross financial need. For the purposes of simulating the distribution of student aid on the basis of financial need, it is helpful to use a flexible definition of need that allows for alternative sets of programs to be "netted" out. For example, the BEOG program, most likely, should be based on gross financial need without the amounts of other types of available aid subtracted. If the BEOG program is designed to provide a base level of financial support to students, then it should be distributed solely on the basis of tuition and other educational expenses without consideration of other sources of financial assistance. For NDSL and CWS, however, it might be more appropriate to subtract the amounts of BEOG, SEOG, institutional grants, and state grants in determining financial need for the purpose of distributing these loan and work study funds.

Table 6 is presented to show not only the total level of financial need under alternative definitions but also the different distributions of need across institution and income categories. For example, the difference between gross financial need and net need (with only institutional aid subtracted from gross need) is around $800 million. Also, since private four-year institutions allocate a relatively large amount of resources for student aid, these institutions decrease their proportion of the total need significantly (especially for the lower income students) while public two-year institutions, with relatively little institutional aid, show an increase in the percentage of total need after institutional aid is subtracted from gross need.

It is difficult to determine the actual intent of student aid legislation with respect to how the aid is to be distributed on the basis of need. Clearly, the intent is to provide financial assistance to needy

Table 6

DISTRIBUTIONS OF FINANCIAL NEED UNDER ALTERNATIVE DEFINITIONS
1972-1973

Institutional Category	Family Income Category	Gross Financial Need	Net Financial Need A	Net Financial Need B	Net Financial Need C	Net Financial Need D
Public 4-year	$0-6,000	15.1%	14.3%	12.7	14.0	7.5
	6,000- 9,000	13.9	14.2	14.2	14.1	14.6
	9,000-12,000	13.4	14.4	15.4	14.2	18.7
	12,000 +	0	0	0	0	0
Public 2-year	0-6,000	4.9	5.3	5.0	4.1	2.5
	6,000- 9,000	4.4	4.9	5.0	4.2	4.9
	9,000-12,000	3.2	3.6	3.9	3.3	4.2
	12,000 +	0	0	0	0	0
Private 4-year	0-6,000	10.2	8.4	7.5	9.7	5.3
	6,000- 9,000	10.4	9.7	9.6	10.6	10.7
	9,000-12,000	11.3	11.9	12.8	12.1	16.5
	12,000 +	11.2	11.1	12.0	12.1	13.7
Private 2-year	0-6,000	0.7	0.7	0.6	0.5	0.1
	6,000- 9,000	0.6	0.6	0.6	0.5	0.6
	9,000-12,000	0.5	0.6	0.6	0.5	0.7
	12,000 +	0.1	0.1	0.1	0.1	0
Total dollars (thousands)		$5,861	$5,061	$4,616	$5,405	$3,096

Note: A: Gross financial need minus institutional student aid.

B: Gross financial need minus institutional student aid and state student aid.

C: Gross financial need minus BEOG and SEOG.

D: Gross financial need minus all currently available student aid.

Source: SRI.

students. As illustrated above, a simple definition of need does not exist, so many factors must be considered. The simulation model was designed to examine the effects of two key factors: the expected parental contribution schedule and the definition of need in terms of other aid sources to be included. Another dimension that must be considered is the interpretation of the intent to assist needy students. Is it the intent of federal student aid programs to meet the total need of the most needy students first and then provide what is left to the less needy students? Or is the intent to reduce the need of all students proportionally? The latter procedure is used primarily in the simulation model, although an alternative procedure is included that allows the other distribution strategy to be examined. Experimentation with these alternative procedures and definitions of need and comparison with actual distributions lead to a better understanding of the student aid distribution process. The simulation model has been designed to allow for alternative specifications of financial need for each run of the model.

Simulation Input Requirements

Since the intent of developing a simulation model is to have a tool for exploring the impacts of alternative programs under different sets of assumptions, it is important to design the input component of the program so that all the information needed to specify a run of the model can be provided quickly and easily. To accomplish this objective, all the input required for the model is read in through a question-answer procedure on a time-share terminal. All these questions or commands for this simulation model are listed below.

Although the list of questions is quite large, the time required to specify the input parameters for any one simulation run is quite small (3 to 4 minutes). For any one simulation run, usually only a small portion of the questions have to be answered. Default parameters are built into the program.

A brief description of the purpose and the range of responses for each input query is given below. This description along with Figure 1 provides a good outline of the dimensions and capabilities of the simulation model.

Input Requirements for a Simulation Run

[1] Enter enrollment code:

1 = all students distributed across income as dependent students.

2 = only dependent students included.

3 = independent students included and distributed on the basis of financial need.

(With our limited knowledge about the number and characteristics of independent students and with the uncertainty as to how financial aid officers handle independent students, it is useful to run simulations with and without independent students. A more complete description of independent student procedures is given in Chapter III).

[2] Enter a number for the expected parental contribution for each of the following parental income categories:

$0-6,000
6,000- 9,000
9,000-12,000
12,000 + (public 4-year)
12,000 + (public 2-year)
12,000 + (private 4-year)
12,000 + (private 2-year)

(Since there is little agreement as to the appropriate schedule to be used for determining financial need, it is useful to calculate the effect on student aid distributions of alternative expected parental contribution schedules.)

[3] Enter a zero if the simulation is to be run on national aggregate data; otherwise enter a one

> (For many initial analyses it is useful to run the model on national aggregate data instead of state data. If national aggregate data are to be used, the following four questions are not asked.)

[4] Enter number of states to be included in the simulation.

> (The student aid simulation may be run on all states individually or on selected states. If all states are to be run, the next question is not asked.)

[5] List the index numbers of the states to be included in the simulation.

> (The index numbers start with 10 for Alabama and end with 60 for Wyoming.)

[6] Enter a "1" if the simulation is to be run with given state allocations.

> (For some analyses, it is useful to specify the amount of aid available for distribution within each state. These amounts should be inputted here. This feauure makes it possible to examine the distribution of state student aid programs and their interaction with federal student aid programs and institutional tuition changes.)

[7] List the student aid allocations for the states to be included in the simulation.

> (This question is omitted if no allocations are indicated in the previous question.)

[8] Enter basic grant information:

(a) maximum per student grant

(b) weights for distribution factors.

> (If the simulation run is to include a basic grant program, the above information must be supplied. The distribution factors currently include the number of 1974-75 BEOG applicants and the 1972-73 FTE undergraduate, degree-credit enrollment.)

[9] Enter tuition information:

(a) institutional category

(b) new tuition level

(c) percentage of tuition increase to be redistributed as student aid.

(This information only needs to be given for those institutional categories where it is assumed that there are changes from the 1972-73 tuition level. Chapter IV describes the procedure for analyzing tuition changes.)

[10] Enter number of student aid packages.

(In the simulation model, an aid package can include up to one grant, one loan, and one work study program. The model is designed to assess the impact of several packages of student aid programs simultaneously. For each package, the nine questions asked below must be answered.)

[11] Enter aid packaging information for the calculation of financial need:

(a) BEOG, enter "1" if it is to be included in current aid.

(b) SEOG, enter "1" if it is to be included in current aid.

(c) CWS, enter "1" if it is to be included in current aid.

(d) NDSL, enter "1" if it is to be included in current aid.

(e) GSL, enter "1" if it is to be included in current aid.

(f) Institutional aid, enter "1" if it is to be included in current aid.

(g) State aid, enter "1" if it is to be included in current aid.

(This input information defines the current student aid programs that are to be included in the definition of net financial need for distributing additional student aid. This procedure makes it possible to explore various packaging strategies from the perspective of the federal government.)

[12] Enter a "1" if aid adjustment factors are used.

(These factors are derived from the student aid data to reflect the degree to which financial aid officer preferences and institutional competition influence the distribution of student aid. In attempting to estimate the most likely distribution to result from proposed program changes, it is appropriate to use these factors. However, for exploratory analyses, it is of interest to calculate the aid distribution solely on the basis of alternative definitions of financial need.)

[13] Enter a "1" if a federal package of aid; enter a "2" if a state package.

(This distinction is necessary only to keep the analyses separate for the output tables. Except for the parameters listed below, federal and state programs are treated identically in the model.)

[14] Enter federal (state) student grant information:

(a) total dollars of aid.

(b) income cutoff level.

(c) maximum grant size in dollars.

(d) maximum grant relative to student cost

(e) enrollment code (1 = full-time, 2 = part-time, 3 = full-time equivalent, 4 = head count).

(f) eligible institutional categories.

(This information for each grant program contains several of the key legislative rules and regulations that describe the aid programs.)

[15] Enter institutional aid matching percentage.

(This reflects the amount of resources that each institution must contribute to participate in a particular program. For example, the college work-study program currently requires a 20% matching level of support by the institution.)

[16] Enter percentage of institutional aid available for matching:

(a) percentage available for public 4-year

(b) percentage available for public 2-year

(c) percentage available for private 4-year

(d) percentage available for private 2-year.

(Not all the institutional resources committed to student aid are available for matching purposes. Much of the institutional student aid is based on non-need criteria and therefore is not suited for matching federal need-based programs. Also, some institutional student aid funds may already be used for matching other aid sources [state or other federal]. These percentages are most likely to vary across institutional categories.)

[17] Enter SEOG supplementary information:

(a) code (= 1 if a special ability based SEOG program)

(b) percentage eligible in low ability quartile

(c) percentage eligible in low-average ability quartile

(d) percentage eligible in high-average ability quartile

(e) percentage eligible in high ability quartile.

(This procedure is included to illustrate the type of flexibility that can be built into the structure of the simulation model to support a special analysis. This example was designed for an analysis of the impact that the addition of an ability criteria might have on the distribution of the SEOG program.)

[18] Enter federal (state) student loan information:

(a) total dollars of aid.

(b) income cutoff level.

(c) maximum loan size in dollars

(d) maximum loan relative to student cost.

(e) enrollment code (1 = full-time, 2 = part-time, 3 = full-time equivalent, 4 = head count).

(f) eligible institutional categories.

(This information for each loan program contains several of the key legislative rules and regulations that describe the aid program.)

[19] Enter federal (state) student work-study information:

(a) total dollars of aid.

(b) income cutoff level.

(c) maximum support amount in dollars.

(d) maximum support amount relative to student cost.

(e) enrollment code (1 = full-time, 2 = part-time, 3 = full-time equivalent, 4 = head count).

(This information for each work-study program contains several of the key legislative rules and regulations that describe the aid program.)

II DATA BASE

The data file for the simulation model is organized by state and within state by variable, institutional category, and family income. Data for independent students are included as an extra "family income" category. A sample listing of the data file is given at the end of this chapter. In addition to this base of data, the interactive input procedure for the simulation model allows for additional information that can be changed for each run of the model, and several parameters for calculating price response coefficients are required for the model. These latter parameters are described in Chapter III.

The basic source of enrollment data is the Higher Education General Information Surveys (HEGIS) from the National Center for Educational Statistics (NCES) for the year 1972-73. The distribution of undergraduate, degree-credit enrollment by family income was calculated from the Tripartite Application Forms for 1972-73 filed by all institutions planning to participate in at least one of the three campus-based federal student aid programs (SEOG, CWS, and NDSL). This distribution across income, along with estimates of the number of independent students, was applied to the HEGIS enrollment data to yield estimates of enrollment by state, institutional type, and family income level for dependent students.

The distribution of student aid dollars by state, institutional type, and family income for the three campus-based federal programs (SEOG, CWS, NDSL) was obtained from the student aid Fiscal Operations Report forms filed by all institutions that participated in at least one of the three campus-based federal programs.

The Basic Educational Opportunity Grant (BEOG) officials provided state-by-state distributions of basic-grant-qualified applicants for two different points in the current processing year. A distribution of basic-grant-qualified applicants was made available by state and institutional category as of November 30, 1974. A distribution of qualified applicants by family income interval and state was provided as of January 7, 1975. Since this program was not in existence during 1972-73, the 1974-75 year was used as the base; this represented the distribution of funds from this program during its second year of operation. Given the nature of the BEOG program, only freshmen and sophomores were eligible this past year, and it will not be until 1976-77 that all undergraduates will be eligible. Therefore, accurate assessment of the distribution of this program for the next few years is difficult.

The distribution for the Guaranteed Student Loan (GSL) program was estimated for the institutional categories within each family income category. Data on the total dollars of GSL were available on a state-by-state basis from the Reports and Data Analysis staff of the USOE Division of Insured Loans. Percentages for estimated loans to graduate students and students attending types of schools not included in this study (trade and vocational postsecondary institutions) were subtracted from each state's total amount of loans. State-by-state income distributions of loan recipients were available for 1971-72 from the Reports and Data Analysis staff, but data were not available for different types of institutions within each state.

In most states, institutional aid represents approximately one-fourth of all available student aid dollars. It is therefore important to approximate its distribution by family income level of the recipients and by type of institution attended. The primary source for the total amount of institutional financial aid to students was the Institutional Application To Participate in Federal Student Financial Aid Programs for 1972-73. The Higher Education Amendments of 1968 require that the institutions report and spend for financial aid the amount listed on their application under "maintenance of level of support" in order to participate in one or more of the three institution-based federal programs (SEOG, CWS, and NDSL). Although the total amount of institutional aid can be determined fairly accurately from the application data, the distribution of aid across family income categories is not directly available. Since much of the institutional aid is not primarily distributed on the basis of financial need, it was assumed that students in each family income category had an equal opportunity to receive assistance from the institutional funds.

There are two major estimates for the number of independent students at different types of colleges. One estimate comes from the college financial aid administrators who gather data from the form called Application(s) To Participate in Federal Student Aid Programs (Tripartite). The other source is statewide surveys of student demographic characteristics, financial circumstances, and financial aid resources. These data are gathered with an instrument developed by the College Entrance Examination Board, the Student Resource Survey (SRS). Data gathered from SRS administrators in California, Montana, Oregon, Pennsylvania, and Washington were utilized in developing estimates of the number of independent students in each state.

Tuition costs and total costs of attendance were obtained for each of the institutional categories in all of the states from the Tripartite Application Forms for 1972-73. These cost figures were similar to those published annually by the College Scholarship Service on a national basis by type of institution.

The amount of student financial assistance provided from state scholarship programs was obtained from the annual survey of the National Association of State Scholarship Programs conducted by Joseph Boyd. The distribution of these need-based funds within states across the institutional and family income categories was approximated to be equal to the distribution of the sum of the federal SEOG and CWS programs.

The number of high school graduates for each state was taken from the Digest of Educational Statistics, 1973 Edition, published by the National Center of Educational Statistics.

The state effort index is taken from a paper entitled "A Proposal To Fund States on the Basis of Their Support of Higher Education" by Ben Lawrence and Wayne Kirschling, National Center for Higher Education Management Systems, 1974. This effort index is a composite of two factors: (1) an index of the effort each state made in supporting higher education, and (2) the total number of students who were enrolled in public and private higher education institutions of each state.

Additional detail on the development of the data briefly described above is given in an accompanying research note by Ann Hershberger et al., entitled The Development of the Data Base for "Student Aid: Description and Options," Stanford Research Institute, 1975. The discussions in that report on data for independent students, for the GSL program, and for the BEOG program include the most recent information on these topics.

The data base for the simulation model is organized with one record of data for each state and one record for the nation as a whole. The variables contained in the data base are defined below. All the data in the national aggregate record are printed on the two pages following this list of variables. The column headings for these tables refer to the parental income categories for dependent students and a final column for independent students whenever applicable. The row headings refer to the institutional categories.

POP: Number of 15- to 18-year-olds in 1970 by level of parental income. These numbers are from a sample that should be inflated by a factor of 122 to represent the total population.

EUGFT: Full-time, undergraduate, degree-credit enrollment by family income and type of institution. These enrollment numbers include dependent and independent students.

EUGPT: Part-time, undergraduate, degree-credit enrollment by family income and type of institution. These enrollment numbers include dependent and independent students.

EFRST: First-time, full-time, undergraduate, degree-credit enrollment by family income and type of institution. These enrollment numbers include dependent and independent students.

TUITEX: Average tuition and required fees by type of institution for state residents.

TOTCST: Average student budget (total cost of attendance) by type of institution for dependent students.

TCSTI: Average student budget by type of institution for independent students.

BGAPPD: Number of qualified applicants (dependent students only) for BEOG.

BGAPPI: Number of qualified applicants (independent students only) for BEOG.

PINDEP: Number of independent students by their own income and by type of institution.

DSEOG: Dollars of SEOG by type of institution and family income for dependent students and by type of institution and total dollars for independent students.

DBEOG: Dollars of BEOG by type of institution and family income for dependent students and by type of institution and total dollars for independent students.

DCWS: Dollars of CWS aid by type of institution and family income for dependent students and by type of institution and total dollars for independent students.

DGSL: Dollars of GSL by type of institution and family income for dependent students and by type of institution and total dollars for independent students.

DNDSL: Dollars of NDSL by type of institution and family income for dependent students and by type of institution and total dollars for independent students.

DINAID: Dollars of student aid from institutional funds by type of institution and family income for dependent students and by type of institution and total dollars for independent students.

STSAS: Total dollars of student aid from state funds.

HSGRAD: Total number of high school graduates.

STEFRT: State effort index for financing higher education.

National Totals		(0-6)	(6-9)	(9-12)	(12+)	INDEP
POP		31090.	26758.	29591.	67711.	
EOGFT	PU84	571504.	569670.	584987.	1072084.	
	PU82	231199.	221372.	182676.	207694.	
	PR14	189015.	199532.	229643.	638129.	
	PR12	16704.	16734.	15264.	22886.	
EOGPT	PU84	120053.	117066.	114847.	178778.	
	PU82	196598.	210940.	163096.	184761.	
	PR14	35149.	43270.	44338.	67745.	
	PR12	5675.	4441.	3623.	3251.	
EFRST	PU84	195804.	184107.	179654.	308979.	
	PU82	128525.	113890.	91661.	106226.	
	PR14	62567.	66114.	74965.	197605.	
	PR12	6583.	6655.	5725.	7139.	
TUITEX	PU84	516.				516.
	PU82	414.				414.
	PR14	2120.				2120.
	PR12	1302.				1302.
TOTCST	PU84	2580.				
	PU82	2177.				
	PR14	4018.				
	PR12	2966.				
TCSTI	PU84					3348.
	PU82					3277.
	PR14					4975.
	PR12					4119.
BGAPPD	PU84	76806.	45282.	37058.	21903.	
	PU82	50448.	29711.	24360.	14391.	
	PR14	39890.	23525.	19257.	11385.	
	PR12	11604.	6839.	5601.	3308.	
BGAPPI	PU84	19906.	2042.	225.	19.	
	PU82	44801.	4600.	507.	43.	
	PR14	7423.	761.	84.	7.	
	PR12	8647.	887.	98.	8.	
PINDEP	PU84	394036.	91753.	57669.	53789.	597247.
	PU82	246259.	57204.	28166.	16424.	348052.
	PR14	83590.	20837.	14354.	19719.	138500.
	PR12	5917.	1361.	764.	577.	8619.

National Totals		(0-6)	(6-9)	(9-12)	(12+)	INDEP
DSEOG	PU84	52838690.	21705548.	998953.	108153.	16464128.
	PU82	12846695.	4312850.	64029.	9788.	6732653.
	PR14	37465709.	19991828.	1049448.	142406.	5586735.
	PR12	2265809.	925368.	9739.	2500.	519168.
DBEOG	PU84	74732188.	35319598.	18751441.	6439600.	19315095.
	PU82	51255002.	24957649.	12545382.	4216694.	44204398.
	PR14	35781558.	17432237.	9416853.	3256090.	6972595.
	PR12	10919339.	5293672.	2867860.	992520.	8259001.
DCWS	PU84	65367101.	33237139.	16509043.	7487647.	33027260.
	PU82	21929155.	10611614.	4732710.	2141802.	12781763.
	PR14	29900288.	18880563.	11512689.	8930106.	7554178.
	PR12	3310723.	1712607.	779992.	399194.	1124240.
DGSL	PU84	105852839.	65128787.	69295145.	122426453.	35902326.
	PU82	59250916.	33926195.	28017480.	32716205.	14745476.
	PR14	37503267.	24783453.	29915288.	79485846.	17530112.
	PR12	4258955.	2721997.	2633754.	3670962.	1298876.
DNDSL	PU84	57694001.	46058396.	27461249.	18163140.	23435098.
	PU82	7172881.	4113524.	2374778.	1628572.	359888.
	PR14	40995108.	32845433.	29759858.	36484235.	22953179.
	PR12	2812662.	1802073.	1100765.	765067.	0.
DINAID	PU84	160842047.	98713156.	54844398.	74383593.	99417325.
	PU82	16783871.	9357065.	5137337.	4579835.	13508772.
	PR14	171130959.	119269311.	58188205.	96341120.	51830776.
	PR12	4266876.	2735459.	1391465.	1441610.	1325996.
STSAS		456367559.				
HSGRAD		2943500.				
STEFRT		0.				

III STUDENT AID DISTRIBUTION MECHANISMS

State Distribution Procedures

One means by which the federal government can directly influence the distribution of student aid funds is to specify formulas for allocating the funds to states as part of the student aid program specifications. This procedure is already being used in the three institution-based federal student aid programs (SEOG, CWS, and NDSL), each with different formulas or allocation rules. The simulation model has been designed to analyze the impact of several alternative state formulas on the distribution of student aid.

The specification for the SEOG program is that its funds be distributed to states on the basis of the number of full-time-equivalent (FTE) students in each state relative to the national total FTE enrollment. It is specified that the funds of the CWS program be distributed to states on the basis of three factors: (1) the number of full-time undergraduates enrolled, (2) the number of high school graduates, and (3) the number of 14- to 17-year-olds from families with incomes less than $6,000 during 1969-70. Each of these factors are weighted equally in determining the percentage of CWS funds allocated to each state. The percentage distribution of funds across states resulting from both of these distribution formulas are shown in Table 7. The percentage distributions are different for many states. For example, Alabama does relatively very poorly on the basis of FTE enrollment but does very well on the basis of the "three-factor" formula. Low college participation rates in Alabama result in relatively fewer FTE students compared with high school graduates. Including the latter variable in the distribution mechanism increases the percentage of funds going to Alabama. Also, the number of low income young adults is very large in Alabama relative to many other states.

Table 7

STATE DISTRIBUTION OF AID DOLLARS UNDER ALTERNATIVE ALLOCATION FORMULAS

State	FTE[*]	Three Factors[†]	Gross Need[‡]	Need Less Tuition[§]
Alabama	1.48	2.28	1.20	1.41
Alaska	.11	.12	.16	.21
Arizona	1.12	.96	.93	1.23
Arkansas	.77	1.23	.61	.76
California	11.58	8.58	11.73	16.12
Colorado	1.43	1.21	1.49	1.62
Connecticut	1.50	1.25	1.50	1.14
Delaware	.28	.28	.22	.26
District of Columbia	.64	.44	1.09	.89
Florida	2.88	3.18	2.91	3.12
Georgia	1.72	2.53	1.46	1.58
Hawaii	.44	.38	.33	.48
Idaho	.35	.40	.33	.42
Illinois	4.83	4.71	5.28	4.43
Indiana	2.39	2.31	2.09	1.61
Iowa	1.38	1.44	1.34	1.05
Kansas	1.39	1.27	1.12	1.32
Kentucky	1.23	1.90	.87	.93
Louisiana	1.79	2.41	1.38	1.74
Maine	.44	.50	.54	.49
Maryland	1.62	1.64	1.45	1.35
Massachusetts	3.57	2.65	4.85	2.92
Michigan	4.22	3.87	3.91	4.00
Minnesota	2.01	2.59	1.89	1.87
Mississippi	1.07	1.15	.75	.93
Missouri	2.11	1.95	2.03	2.00
Montana	4.01	.40	3.96	5.07
Nebraska	.85	.80	.83	.95
Nevada	.16	.20	.18	.23
New Hampshire	.45	.36	.61	.35
New Jersey	2.48	2.62	2.59	2.32
New Mexico	.57	.67	.48	.62

Table 7 (concluded)

State	FTE[*]	Three Factors[†]	Gross Need[‡]	Need Less Tuition[§]
New York	9.54	7.90	11.78	9.49
North Carolina	2.19	3.04	2.02	2.05
North Dakota	.41	.41	.32	.41
Ohio	4.67	4.70	4.19	3.27
Oklahoma	1.56	1.54	1.46	1.94
Oregon	1.18	1.07	1.26	1.42
Pennsylvania	4.90	5.31	5.61	3.64
Rhode Island	.57	.45	.72	.40
South Carolina	1.11	1.67	1.01	1.07
South Dakota	.41	.48	.39	.40
Tennessee	1.92	2.40	1.71	1.91
Texas	5.74	6.33	4.97	6.44
Utah	1.03	.69	1.09	1.40
Vermont	.35	.27	.45	.24
Virginia	1.80	2.31	1.52	1.50
Washington	1.99	1.65	1.75	1.97
West Virginia	.82	1.04	.62	.77
Wisconsin	2.31	2.24	2.37	2.50
Wyoming	.17	.17	.19	.28

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[*] State allocation based on the number of FTE undergraduates enrolled.

[†] State allocation based on 1/3 the number of full-time undergraduates enrolled + 1/3 the number of high school graduates + 1/3 the number of 14- to 17-year-olds from families with incomes less than $6,000.

[‡] State allocation based on gross need (total student budget minus expected parental contribution).

[§] State allocation based on need less tuition (total student budget minus tuition and expected parental contribution: Need less tuition equals gross need minus tuition).

Source: SRI.

Two additional state allocation rules are illustrated in this section. The first of these procedures is to base the state distributions of aid funds on the level of gross financial need in each of the states. "Gross need" is defined as total cost of attendance minus expected parental contribution. The rationale for such an allocation rule is simply to put the money where the need is greatest. Since this distribution procedure would allocate more money to states with high tuition, an alternative, but similar, allocation rule has been developed. Instead of gross need, the aid funds are distributed to states on the basis of gross need minus tuition or "need less tuition." The rationale for this allocation formula is again to put the money where the need is greatest but also to prevent the federal student aid dollars from subsidizing state tuitions. The state distributions of aid resulting from these two allocation rules are also illustrated in Table 7. It is interesting to note that with the large variation in tuition levels and types of institutions across states, the allocations with the "gross need" and "need less tuition" procedure are significantly different. Massachusetts is an extreme illustration of this point. Under the "gross need" procedure, Massachusetts would receive 4.85% of the aid dollars, while under the "need less tuition" distribution Massachusetts would receive only 2.92%.

The simulation model provides a means of calculating the distribution of federal aid under a variety of different state allocation formulas. Any index that can be calculated from the variables in the data base can be used fairly easily in the model as it is currently structured.

Student Aid Packaging

One of the difficulties involved in attempting to simulate the distribution of student aid programs is that aid is most often awarded in the form of a package. That is, a student is usually awarded some amount of a grant and an additional amount of a loan and/or work study support.

The packaging of student aid at the institutional level is an attempt to assist the most students with the limited combination of student aid resources that are available. At the state and federal levels, the mix of programs made available should be designed to support the best packages for different types of students at different types of institutions. Unfortunately, very little is known about the types of packages preferred by various categories of students. Obviously, students would prefer a grant to a loan or work study aid. Thus, the choice must be presented in the form of whether or not the individual will attend college or not when offered a certain package of aid. Although much more extensive data are needed to understand packaging behavior and responses more completely, it is useful to examine the average package of aid given to different students at different types of institutions (see Table 8). These average packages are determined by many factors, only one of which is the preference of students. The availability of student aid resources and the strategies of financial aid officers are also key determinants. The usual economic problem of observing only the intersection of the supply and demand curves instead of each curve separately is present here.

The packages of aid available for each state are shown in Table 9. A highly significant variation exists in the mix of grants, loans, and work study aid available across states. Nine states have more than 40% of the federal student aid received in the form of grants (Alabama, Alaska, Louisiana, Mississippi, Nebraska, New Mexico, North Carolina, Oklahoma, and South Carolina), while five states have less than 20% of their total federal aid in the form of grants (Connecticut, Indiana, North Dakota, Rhode Island, and Virginia).

For the purposes of this simulation model, the capability to package aid by ordering the sequence of programs to be distributed has been developed. For example, BEOG awards might be distributed first, followed by the simultaneous distribution of SEOG, NDSL, and CWS, with GLS distributed after all the other aid.

Table 8

AVERAGE PACKAGES OF AID

Institutional Category	Parental Income Category	Grants*	Loans†	Work Study‡
Public 4-year	$0-6,000	36	46	18
	6,000- 9,000	28	55	16
	9,000-12,000	14	73	13
	12,000 +	4	91	5
Public 2-year	$0-6,000	42	44	14
	6,000- 9,000	37	49	14
	9,000-12,000	26	64	10
	12,000 +	11	84	5
Private 4-year	$0-6,000	40	43	17
	6,000- 9,000	33	51	16
	9,000-12,000	12	74	14
	12,000 +	3	90	7
Private 2-year	$0-6,000	56	30	14
	6,000- 9,000	50	36	14
	9,000-12,000	39	51	10
	12,000 +	17	76	7
Total	$0-6,000	39	44	17
	6,000 9,000	32	52	16
	9,000-12,000	16	71	13
	12,000 +	4	90	6

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[*] BEOG plus SEOG.

[†] NDSL plus GSL.

[‡] CWS.

Source: Calculated from Fiscal-Operations Report data, 1972-73.

Table 9

AVERAGE DOLLAR AND PERCENTAGE MIX OF AID BY STATE
(Dollars in Thousands)

State	Grants		Loans		Work Study	
Alabama	13,207	(40%)	13,555	(41%)	6,656	(19%)
Alaska	392	(44%)	246	(27%)	265	(29%)
Arizona	5,139	(34%)	7,806	(51%)	2,250	(15%)
Arkansas	6,186	(38%)	6,163	(38%)	3,779	(24%)
California	56,756	(33%)	95,538	(55%)	20,655	(12%)
Colorado	6,924	(26%)	16,528	(61%)	3,456	(13%)
Connecticut	5,553	(14%)	29,586	(78%)	2,998	(8%)
Delaware	1,265	(34%)	1,828	(49%)	639	(17%)
District of Columbia	3,526	(33%)	5,646	(54%)	1,362	(13%)
Florida	15,744	(31%)	27,514	(53%)	8,261	(16%)
Georgia	11,790	(37%)	14,097	(44%)	6,207	(19%)
Hawaii	1,275	(27%)	2,519	(54%)	916	(19%)
Idaho	1,844	(27%)	3,830	(56%)	1,143	(17%)
Illinois	30,567	(31%)	56,316	(57%)	12,455	(12%)
Indiana	9,088	(19%)	31,933	(69%)	5,476	(12%)
Iowa	7,585	(28%)	24,609	(59%)	4,811	(13%)
Kansas	7,101	(28%)	14,915	(59%)	3,393	(13%)
Kentucky	8,387	(32%)	11,881	(46%)	5,636	(22%)
Louisiana	13,324	(41%)	12,597	(39%)	6,704	(20%)
Maine	2,667	(24%)	7,003	(64%)	1,257	(12%)
Maryland	9,184	(30%)	17,505	(57%)	4,121	(13%)
Massachusetts	13,564	(23%)	37,329	(64%)	7,320	(13%)
Michigan	23,427	(37%)	30,052	(47%)	10,303	(16%)
Minnesota	10,774	(23%)	30,505	(65%)	5,796	(12%)
Mississippi	12,254	(42%)	10,842	(38%)	5,836	(20%)
Missouri	11,634	(33%)	17,672	(49%)	6,454	(18%)
Montana	2,193	(24%)	4,807	(52%)	2,212	(24%)
Nebraska	4,248	(43%)	3,399	(34%)	2,239	(24%)
Nevada	902	(37%)	1,212	(49%)	351	(14%)
New Hampshire	1,863	(26%)	4,119	(59%)	1,058	(15%)
New Jersey	17,769	(27%)	42,933	(64%)	6,038	(9%)
New Mexico	5,272	(46%)	3,992	(35%)	2,133	(19%)
New York	66,273	(27%)	176,269	(72%)	2,183	(1%)
North Carolina	17,323	(41%)	15,034	(36%)	9,847	(23%)
North Dakota	2,720	(17%)	11,538	(73%)	1,503	(10%)
Ohio	21,663	(30%)	40,013	(55%)	11,223	(15%)
Oklahoma	10,263	(44%)	8,873	(38%)	4,075	(18%)
Oregon	7,569	(35%)	10,916	(51%)	2,935	(14%)
Pennsylvania	26,516	(20%)	94,035	(70%)	13,517	(10%)
Rhode Island	2,434	(17%)	9,955	(72%)	1,528	(11%)
South Carolina	10,182	(54%)	4,269	(23%)	4,456	(23%)
South Dakota	3,058	(24%)	7,736	(62%)	1,743	(14%)
Tennessee	11,130	(35%)	14,309	(44%)	6,898	(21%)
Texas	35,892	(37%)	44,093	(46%)	16,337	(17%)
Utah	2,841	(25%)	6,894	(59%)	1,881	(16%)
Vermont	1,358	(24%)	3,771	(67%)	539	(9%)
Virginia	10,507	(17%)	25,247	(40%)	27,459	(43%)
Washington	8,755	(27%)	19,732	(61%)	3,787	(12%)
West Virginia	4,136	(25%)	9,038	(54%)	3,415	(21%)
Wisconsin	11,970	(24%)	30,547	(63%)	6,297	(13%)
Wyoming	970	(32%)	1,611	(53%)	478	(15%)

Source: SRI.

Perhaps the most inadequately specified component of the simulation model is the price response coefficients and aid packaging. The response of individuals to the amount of aid received from one program may depend on the amount of aid available from other programs. For example, loans may be very helpful toward inducing individuals to enroll if $500 of grant aid is also available. Individuals may not want to borrow for all their educational expenses but may be willing to borrow enough to supplement the amount of grant aid received.

Basic Grant Distribution Procedure

The BEOG program is an extremely difficult one for the federal government to administer. Contrary to procedures for other programs, the federal government processes the individual student applications directly. Although this procedure avoids a lot of intermediate steps such as intermediate state allocations and institutional allocations, direct processing makes it much more difficult to estimate the number of students who will apply. Since the BEOG program is new, the federal government has little experience to aid in anticipating the number of applicants. Hence, the difficulty with the BEOG program is estimating the number of applicants and then determining an award structure that will result in the total funding level that is desired.

To provide information useful for determining the total dollars of of BEOGs resulting from alternative award structures and estimates of the number of applicants, a procedure was developed within the simulation model. Two basic series of data were used for estimating the number of eligible applicants by income and institutional categories for each state. First, the 1974-75 BEOG applicant data, as described in Chapter II, was used as a base. Since the data represented only the second year of the program, these applicants consisted of only freshmen and sophomores. Therefore, these data are somewhat limited in their usefulness for projecting the distribution of applicants to later years. Second, the 1972-73 undergraduate, degree-credit enrollment data by parental income, institutional category, and state can be used to supplement the BEOG applicant data. With these two data series, a variety of approximations can be evaluated to estimate the number of BEOG applicants.

The number of BEOG applicants and the number of undergraduate, degree-credit students are shown for the nation in Table 10. All these figures are for dependent students only. Data are available to develop comparable tables for independent students. As expected, the two-year institutions have a significantly larger percentage of their students applying for BEOGs since only freshmen and sophomores (at that time) were eligible. Also, more students at private four-year colleges and universities apply than do students with comparable parental incomes attending public four-year institutions. Table 11 shows the percentage of undergraduates applying for a basic grant, which varies widely across states. Six of the states have fewer than 6% of the undergraduates applying for basic grants (Alaska, Connecticut, Hawaii, Indiana, Hew Hampshire, and Utah), while seven have more than 13% applying (Alabama, Arkansas, Maine, Mississippi, New Mexico, North Carolina, and South Carolina).

In addition to the determination of the number of eligible applicants, the size of the grants must also be estimated. The BEOG program, as currently specified, has two types of constraints built in that limit the maximum amount of the grant that any one student may receive. The first constraint is that the size of the basic grant should be equal to $1,400 minus the expected parental contribution for the student. The second constraint is that the size of the grant should not exceed 50% of the total cost of attendance. Both of these factors are included in the simulation model. Also, the $1,400 and 50% parameters can be easily changed to different figures via the interactive input procedure.

Table 10

BEOG APPLICANTS IN THE AGGREGATE UNITED STATES BY INSTITUTION AND PARENTAL INCOME 1974-1975

Institutional Category	Parental Income	BEOG Applicants	FTE Undergraduates	Ratio
Public 4-year	$0-6,000	76,806	489,717	15.7
	6,000- 9,000	45,282	489,578	9.2
	9,000-12,000	37,058	501,709	7.4
	12,000 +	21,903	896,907	2.4
Public 2-year	$0-6,000	50,448	203,767	24.8
	6,000- 9,000	29,711	203,217	14.6
	9,000-12,000	24,360	163,142	14.9
	12,000 +	14,391	182,331	7.9
Private 4-year	$0-6,000	39,890	183,572	21.7
	6,000- 9,000	23,525	196,467	12.0
	9,000-12,000	19,257	220,666	8.4
	12,000 +	11,385	581,002	2.0
Private 2-year*	$0-6,000	11,604	17,535	66.2
	6,000- 9,000	6,839	17,316	39.5
	9,000-12,000	5,601	15,853	35.3
	12,000 +	3,308	22,941	14.4

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*The ratios for private 2-year schools are suspect because of the difficulties in defining the institutional type. The Basic Grant Office reports a larger number of institutions in the category than does the Higher Education Directory, Office of Education, DHEW, 1973.

Source: SRI.

Table 11

BEOG Applicants By State
1974-1975

State	BEOG Applicants	FTE Undergraduates	Ratio
Alabama	12,069	81,202	14.9
Alaska	351	5,854	6.0
Arizona	4,772	61,007	7.8
Arkansas	5,618	42,246	13.3
California	48,793	633,368	7.7
Colorado	5,934	78,399	7.6
Connecticut	4,425	82,065	5.4
Delaware	1,103	15,985	6.9
District of Columbia	2,543	35,188	7.2
Florida	13,622	157,230	8.7
Georgia	9,952	93,931	10.6
Hawaii	1,077	24,121	4.5
Idaho	1,924	24,328	7.9
Illinois	25,648	264,024	9.7
Indiana	7,049	130,442	5.4
Iowa	6,704	75,597	8.9
Kansas	6,323	76,230	8.3
Kentucky	7,494	73,177	10.2
Louisiana	11,953	97,978	12.2
Maine	3,135	24,011	13.1
Maryland	7,736	88,407	8.8
Massachusetts	12,323	195,431	6.3
Michigan	19,794	230,829	8.6
Minnesota	9,357	109,891	8.5
Mississippi	12,405	58,773	21.1
Missouri	10,573	115,635	9.1
Montana	2,020	21,898	9.2
Nebraska	3,794	46,486	8.2
Nevada	994	8,905	11.2
New Hampshire	1,487	24,797	6.0
New Jersey	16,260	135,686	12.0
New Mexico	4,915	31,040	15.8
New York	60,975	521,752	11.7
North Carolina	15,652	119,977	13.0
North Dakota	2,523	22,301	11.3
Ohio	18,096	255,307	7.1
Oklahoma	9,162	85,266	10.7
Oregon	6,601	64,346	10.3
Pennsylvania	26,324	267,951	9.8
Rhode Island	2,624	31,253	8.4
South Carolina	9,689	60,934	15.9
South Dakota	2,808	22,438	12.5
Tennessee	9,315	105,128	8.9
Texas	32,056	313,664	10.2
Utah	1,756	56,292	3.1
Vermont	1,334	19,185	7.0
Virginia	9,141	98,465	9.3
Washington	7,800	108,995	7.2
West Virginia	3,364	44,954	7.5
Wisconsin	9,458	126,203	7.5
Wyoming	685	9,566	7.2

Source: SRI.

Preferences of Financial Aid Officers

The preferences of financial aid officers are extremely important in determining student aid distributions but are difficult to define and measure objectively. The number and characteristics of individuals who receive aid are greatly influenced by the behavior and practices of the financial aid officers at colleges and universities. Therefore, it seems useful to examine the preferences that these officers have for different types of students (and potential students). Evaluation studies of each of the three major federal student aid programs (EOG,[*] CWS,[†] and NDSL[‡]) have included surveys of financial aid officers. The results of these surveys with respect to the preferences of financial aid officers for students under each of the programs are presented in Tables 12 through 14. The preferences of financial aid officers shown to minorities and to academic performance (Table 12) suggest that financial need is not the sole criterion for awarding student aid. The same situation exists for CWS funds (Table 13) and to a much lesser degree for NDSL funds (Table 14). It is interesting that for the CWS and NDSL programs the aid officers indicate strong preferences for students not eligible to receive other types and sources of aid. Also for CWS, preference is given to students for which other aid can be matched.

Although it is not possible to separate the effects of many factors that influence the actual distribution of student aid funds, a procedure

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[*] Friedman, N., "The Federal Educational Opportunity Grant Program: A Status Report, Fiscal Year 1970," Bureau of Applied Social Research, Columbia University, 1971.

[†] Friedman, N., L. Sanders, and J. Thompson, "The Federal College Work-Study Program: A Status Report, Fiscal Year 1971," Bureau of Applied Social Research, Columbia University, 1973.

[‡] Educational Testing Service, "National Survey of Institutions Participating in the NDSL Program," unpublished data, 1974.

Table 12

RECIPIENT PREFERENCES OF FINANCIAL AID OFFICERS FOR THE EOG PROGRAM

Student Category	Public			Private		
	University	4-year College	2-year College	University	4-year College	2-year College
Preference given to:						
Freshmen	87.2%*	85.6%	68.2%	100.0%	79.4%	68.4%
Local residents	24.4	18.7	28.7	0.0	5.8	8.9
Upperclassmen	19.2	25.0	39.5	11.8	33.7	45.6
Academic Performance	16.7	23.4	20.5	11.8	24.9	17.7
Minorities	65.4	61.0	58.1	70.6	68.0	61.3
Generally not awarded to:						
Transfer students	12.8	10.7	13.6	17.0	16.9	17.9
Married students	53.8	42.7	24.9	30.2	38.4	26.0
Evening students	41.0	43.1	33.9	43.4	34.8	35.0

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*Numbers indicate the percent of financial aid officers indicating a preference for the particular type of student.

Source: Friedman, N., "The Federal Educational Opportunity Grant Program: A Status Report, Fiscal Year 1970," Bureau of Applied Social Research, Columbia University, 1971.

Table 13

RECIPIENT PREFERENCES OF FINANCIAL AID OFFICERS FOR THE CWS PROGRAM FOR ALL INSTITUTIONS

(Percent)

Student Category Given Preference	All Institutions
Entering freshmen	16.6%*
Upperclassmen	35.5
Academic performance	14.9
Not eligible for other aid	23.7
Matched with other aid	31.8
Apply first	48.5
Local residents	17.0
Minorities	48.7
Special job skills	5.9

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*Numbers indicate the percent of financial aid officers indicating a preference for the particular type of student.

Source: Friedman, N., L. Sanders, and J. Thompson, "The Federal College Work-Study Program: A Status Report, Fiscal Year 1971," Bureau of Applied Social Research, Columbia University, 1973.

Table 14

RECIPIENT PREFERENCES OF FINANCIAL AID OFFICERS FOR THE NDSL PROGRAM

Student Category Given Preference	Public University	Public 4-year College	Public 2-year College	Private University	Private 4-year College	Private 2-year College
Freshmen	13.5%*	11.8%	12.4%	23.2%	16.5%	22.8%
Renewing upperclassmen	54.7	52.9	50.6	62.1	61.1	34.8
First-time upperclassmen	2.3	5.9	8.7	16.8	6.7	7.0
Academic performance	6.3	3.9	6.5	5.6	5.6	8.9
Potential teachers	3.1	4.9	5.2	6.6	8.4	6.3
Men	2.7	2.0	2.2	2.5	2.6	1.9
Women	2.2	2.0	2.2	2.5	3.1	4.4
Financial need	79.3	85.2	70.1	68.5	78.5	81.0
Minorities	10.8	12.8	9.3	16.7	16.8	15.9
Not eligible for other aid	33.6	36.3	45.4	30.8	32.2	41.4
Local residents	2.2	3.9	5.3	1.0	2.0	2.5

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*Numbers indicate the percent of financial aid officers indicating a preference for the particular type of student.

Source: Educational Testing Service, "National Survey of Institutions Participating in the NSDL Program," unpublished data, 1974.

has been included in the simulation model for determining the degree to which the actual aid distribution across family income categories differs from the distribution expected on the basis of financial need. These differences are illustrated in Tables 15 through 19 for the five major federal student aid programs. These estimates of the discrepancy between the actual distribution of an aid program and the distribution expected if aid were awarded entirely on the basis of gross financial need are simply relative weights attached to students with different family incomes attending different types of institutions. The scale of the non-normalized weights is meaningless and therefore the weights have been normalized by setting the adjustment factor for public four-year students with family incomes of $0-$6,000 equal to one. From the normalized ratios it can be seen that students from families with incomes of $0-$6,000 attending private four-year institutions receive 71% as much aid relative to their need as do students with the same family income attending public four-year institutions. These factors for each program and family income category are averaged over the institutional categories and presented in Table 20. Some of these adjustments are highly significant and result from several factors. The primary factor may be the preferences of the financial officers. A second determinant of these adjustments may be the particular definition of financial need used or the specific expected parental contribution schedule used. A final factor may be the preferences and responses of the students.

The purpose of calculating these adjustment factors in the simulation model is to provide a means of crudely incorporating all these other factors into the aid distribution process. Clearly, an attempt to simulate the distribution of student aid solely on the basis of financial need (no matter how defined) leads to inaccurate estimated distributions. Until better information is available, this crude adjustment procedure attempts to correct for these other behavioral factors. The simulation

Table 15

COMPARISON OF ACTUAL AND NEED-BASED DISTRIBUTIONS FOR THE BEOG PROGRAM

Institutional Category	Income Category	Gross Financial Need	BEOG Dollars (thousands)	BEOG Divided by Need	Normalized Ratio
Public 4-year	$0-6,000	$886,388	$74,732	.0843	1.00
	6,000- 9,000	817,595	35,320	.0432	0.51
	9,000-12,000	785,175	18,751	.0239	0.28
	12,000 +	0	6,440	--	--
Public 2-year	$0-6,000	286,700	51,255	.1788	2.12
	6,000- 9,000	257,476	24,958	.0969	1.15
	9,000-12,000	189,571	12,545	.0662	0.79
	12,000 +	0	4,217	--	--
Private 4-year	$0-6,000	596,242	35,782	.0600	0.71
	6,000- 9,000	610,619	17,432	.0285	0.34
	9,000-12,000	662,660	9,417	.0142	0.17
	12,000 +	658,856	3,256	.0049	0.58
Private 2-year	$0-6,000	38,507	10,919	.2836	3.36
	6,000- 9,000	35,602	5,294	.1487	1.76
	9,000-12,000	30,929	2,868	.0927	1.10
	12,000 +	4,955	993	.2004	2.38

Source: SRI.

Table 16

COMPARISON OF ACTUAL AND NEED-BASED DISTRIBUTIONS FOR THE SEOG PROGRAM

Institutional Category	Income Category	Gross Financial Need	SEOG Dollars (thousands)	SEOG Divided by Need	Normalized Ratio
Public 4-year	$0-6,000	$886,388	52,839	.0596	1.00
	6,000- 9,000	817,595	21,706	.0265	0.45
	9,000-12,000	785,175	8	0	0
	12,000 +	0	2	--	--
Public 2-year	$0-6,000	286,700	12,847	.0448	0.75
	6,000- 9,000	257,476	4,313	.0168	0.28
	9,000-12,000	189,751	0	0	0
	12,000 +	0	0	0	0
Private 4-year	$0-6,000	596,242	37,466	.0628	1.05
	6,000- 9,000	610,619	19,992	.0327	0.55
	9,000-12,000	662,660	0	0	0
	12,000 +	658,856	0	0	0
Private 2-year	$0-6,000	38,507	2,266	.0588	0.99
	6,000- 9,000	35,602	925	.0260	0.44
	9,000-12,000	30,929	0	0	0
	12,000 +	4,955	0	0	0

Source: SRI.

Table 17

COMPARISON OF ACTUAL AND NEED-BASED DISTRIBUTIONS FOR THE CWS PROGRAM

Institutional Category	Income Category	Gross Financial Need	CWS Dollars (thousands)	CWS Divided by Need	Normalized Ratio
Public 4-year	$0-6,000	$886,388	65,367	.0737	1.00
	6,000- 9,000	817,595	33,237	.0407	0.55
	9,000-12,000	785,175	16,509	.0210	0.29
	12,000 +	0	7,488	--	--
Public 2-year	$0-6,000	286,700	21,929	.0765	1.04
	6,000- 9,000	257,476	10,612	.0412	0.56
	9,000-12,000	189,571	4,733	.0250	0.34
	12,000 +	0	2,142	--	--
Private 4-year	$0-6,000	596,242	29,900	.0501	0.68
	6,000- 9,000	610,619	18,881	.0309	0.42
	9,000-12,000	662,660	11,513	.0174	0.24
	12,000 +	658,856	8,930	.0136	0.18
Private 2-year	$0-6,000	38,507	3,311	.0860	1.17
	6,000- 9,000	35,602	1,713	.0481	0.65
	9,000-12,000	30,929	780	.0252	0.34
	12,000 +	4,955	399	.0805	1.09

Source: SRI.

Table 18

COMPARISON OF ACTUAL AND NEED-BASED DISTRIBUTIONS FOR THE NDSL PROGRAM

Institutional Category	Income Category	Gross Financial Need	NDSL Dollars (thousands)	NDSL Divided by Need	Normalized Ratio
Public 4-year	$0-6,000	$886,388	$57,694	.0651	1.00
	6,000- 9,000	817,595	46,058	.0563	0.87
	9,000-12,000	785,175	27,461	.0350	0.54
	12,000 +	0	18,163	--	--
Public 2-year	0-6,000	286,700	7,173	.0250	0.38
	6,000- 9,000	257,476	4,114	.0160	0.25
	9,000-12,000	189,571	2,375	.0125	0.19
	12,000 +	0	1,629	--	--
Private 4-year	0-6,000	596,242	40,995	.0688	1.06
	6,000- 9,000	610,619	32,845	.0538	0.83
	9,000-12,000	662,660	29,760	.0449	0.69
	12,000 +	658,856	36,484	.0554	0.85
Private 2-year	0-6,000	38,507	2,813	.0731	1.12
	6,000- 9,000	35,602	1,802	.0506	0.78
	9,000-12,000	30,929	1,101	.0356	0.55
	12,000 +	4,955	765	.1544	2.37

Source: SRI.

Table 19

COMPARISON OF ACTUAL AND NEED-BASED DISTRIBUTIONS FOR THE GSL PROGRAM

Institutional Category	Income Category	Gross Financial Need	GSL Dollars (thousands)	GSL Divided by Need	Normalized Ratio
Public 4-year	$0-6,000	$886,388	$105,853	.1194	1.00
	6,000- 9,000	817,595	65,129	.0797	0.67
	9,000-12,000	785,175	69,295	.0883	0.74
	12,000 +	0	122,426	--	--
Public 2-year	0-6,000	286,700	59,251	.2067	1.73
	6,000- 9,000	257,476	33,926	.1318	1.10
	9,000-12,000	189,571	28,917	.1525	1.28
	12,000 +	0	32,716	--	--
Private 4-year	0-6,000	596,242	37,503	.0629	0.53
	6,000- 9,000	610,619	24,783	.0406	0.34
	9,000-12,000	662,660	29,915	.0451	0.38
	12,000 +	658,856	79,486	.1206	1.01
Private 2-year	0-6,000	38,507	4,258	.1106	0.93
	6,000- 9,000	35,602	2,722	.0765	0.64
	9,000-12,000	30,909	2,634	.0852	0.71
	12,000 +	4,955	3,671	.7409	6.21

Source: SRI.

Table 20

COMPARISON OF AVERAGE ADJUSTMENT FACTORS ACROSS FAMILY INCOME CATEGORIES FOR OFFICE OF EDUCATION PROGRAMS

Aid Program	Adjustment Factor for Students with Family Income of: $0-6,000	$6,000-9,000	$9,000-12,000	$12,000 +
BEOG	1.00	.51	.31	.04
SEOG	1.00	.45	--	--
CWS	1.00	.57	.32	.60
NDSL	1.00	.75	.55	1.46
GSL	1.00	.06	.74	4.30

Source: SRI.

model is designed so that the adjustment factors can be calculated for alternative definitions of financial need and alternate expected parental contribution schedules. Also the aid distributions can be simulated with and without the adjustment factors so comparisons can be made between the adjusted and unadjusted distributions of student aid.

Institutional Competition for Student Aid Funds

As shown in Tables 15 through 19, the relationship between the actual amount of aid received and the amount expected on the basis of gross financial need varies across institutional categories as well as family income categories. The ability (or desire) of institutions to seek and obtain student aid funds varies according to the goals and the orientation of the college or university, and may be the result of a variety of factors. First, many of the federal student aid programs have built in "matching" requirements that force the colleges to have sufficient student aid money available of their own to match some percentage of that received from the federal government. As illustrated in

Table 21, the public two-year colleges are most noticeably affected by matching requirements, whereas private four-year colleges and universities have little problem meeting these requirements.

Second, some institutions use student aid as a means of attracting students with desirable characteristics. These institutions are likely to seek federal student aid dollars more aggressively than other institutions. Third, some institutions have well-established student aid offices that can easily adapt to federal programs, whereas other institutions may have to start or greatly expand such an office to make the aid available to their students.

Because of matching requirement variations and the competitive factors varying across types of federal programs, the adjustment factors that account for deviations between actual and simulated distributions on the basis of need across institutional categories are likely to vary by type of student aid program. The basic information is contained in Tables 15 through 19, and the average adjustment factors across institutional categories are given in Table 22. For the institution-based programs (SEOG, CWS, and NDSL), the private four-year colleges and universities receive a significantly larger share of the aid relative to the other institutional categories than expected on the basis of gross financial need. The public two-year colleges do very poorly relative to their need with the SEOG and NDSL program, but do reasonably well with respect to CWS. It is interesting that the situation is reversed for the noninstitutional-based programs (GSL and BEOG). For these programs, the public two-year colleges do very well, and the private four-year institutions receive the same or slightly less than expected on the basis of gross financial need.

Table 21

NATIONAL AGGREGATE DATA ON MATCHING FUNDS AND REQUIREMENTS
(Dollars in Thousands)
1972-1973

Institutional Category	Institutional Aid*	Aid Available for Matching† (percent)	Matching Funds‡	College Work Study§	National Direct Student Loans§	Matching Requirement**	Unmatched Institutional Aid††	FTE Undergraduate Enrollment‡‡	Unmatched Institutional Aid per FTE§§
Public 4-year	$488,870	61%	$298.211	$129,443	$191,452	$45,034	$253,177	2,975,000	$ 85
Public 2-year	49,541	65	32,202	57,103	23,039	13,724	18,478	1,101,000	17
Private 4-year	496,757	57	283,151	83,121	182,469	34,871	248,280	1,320,000	188
Private 2-year	11,323	66	7,473	8,241	7,497	2,398	5,075	82,000	62

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*Source: Tripartite student aid application data for 1972-73.

†Source: Survey of 100 institutions in the southern region (Davis, J., Student Financial Aid Needs and Resources in the SREB, States: A Comparative Analysis, Southern Regional Education Board, Atlanta, Georgia, 1973), which asked the institutions to divide their own student aid funds into 3 categories as defined below:

General Availability - Unrestricted funds generally but not completely based on financial need for which the largest number of applicants can qualify and from which the largest number may be eligible to receive assistance.

Limited Availability - Funds typically, but not exclusively, awarded or assigned to recipients on the basis of specific characteristics or educational goals with considerations of financial need, but not awarded strictly on the basis of financial need.

Restricted Availability - Funds that are highly restricted by geography, curriculum, secondary school preparation, institutional matriculation, donor preferences or choices, or special and unusual recipient characteristics. Need may or may not be a qualification for an award.

Primarily the first category [illegible] funds are available for matching federal CWS and NDSL funds. The percentages in this column represent the percentage of institutional aid that is in this "general availability" category.

‡Calculated: (Institutional aid) × (proportion of aid available for matching).

§Source: Fiscal Operations Reports student aid data for 1972-73.

**Calculated: [(College-Work-Study) × 0.20] + [(National Direct Student Loans) × 0.10].

††Calculated: (Matching funds) - (Matching requirements).

‡‡Source: Opening Fall Enrollment, National Center for Educational Statistics, 1972.

§§Calculated: (Unmatched institutional aid)/(FTE undergraduate enrollment).

Table 22

COMPARISON OF AVERAGE ADJUSTMENT FACTORS ACROSS INSTITUTIONAL CATEGORIES FOR OFFICE OF EDUCATION PROGRAMS

Aid Program	Adjustment Factors for Students Attending:			
	Public 4-Year	Public 2-Year	Private 4-Year	Private 2-Year
BEOG	1.00	2.40	0.66	3.58
SEOG	1.00	.69	1.14	.99
CWS	1.00	1.08	.76	1.17
NDSL	1.00	.34	1.10	1.01
GSL	1.00	1.70	.52	.95

Source: SRI.

Student Aid Preferences and Responses

In addition to the preferences of financial aid officers and the competition of institutions for student aid funds, the preferences of the students for different types of aid and the degree to which enrollment is induced by the availability of aid must be considered in determining the distribution of aid across income and institutional categories. Most of the student demand studies to date have given estimates of student response to tuition levels and not to alternative financial aid program dollar levels. The term "student response" means the degree to which students are induced to enroll at some higher education institution because of the availability of student aid or a decrease in tuition. The analysis of student aid programs requires some estimates of the responsiveness of potential students to changes in net price (total cost of attendance minus student aid). The results from the tuition studies have been very consistent, and the basic formulation and statistical estimates from the Radner-Miller study are used as the basis for the price elasticity (percentage change in enrollment divided by percentage change in net price) estimates used in the simulation model. A recent study by Carlson used data from several program evaluation studies of federal and state student aid programs to estimate elasticities for a variety of student aid programs (grants, loans, and work study).

The price elasticities estimated by Radner and Miller depend on family income, the percentage of the eligible population (by family income category) that attend each type of institution, and a "Beta" coefficient estimated from their data. The procedure used in the simulation model is to calculate these basic tuition elasticities for the nation and for each state being analyzed by using the appropriate percentages of individuals enrolled by income and by type of institution. These tuition elasticity estimates for the nation are shown in Table 23. The diagonal elements of each matrix indicates the percentage change in

Table 23

STUDENT PRICE RESPONSE COEFFICIENTS BY FAMILY INCOME[*]

Institutional Sector	Institutional Sector			
	Public 4-Year	Public 2-Year	Private 4-Year	Private 2-Year
Family income $0-6,000				
Public 4-year	7.45	-1.66	-1.66	-1.66
Public 2-year	-1.03	8.08	-1.03	-1.03
Private 4-year	-0.54	-0.54	8.57	-0.54
Private 2-year	-0.05	-0.05	-0.05	9.06
Family income $6,000-9,000				
Public 4-year	2.59	-0.69	-0.69	-0.69
Public 2-year	-0.43	2.85	-0.43	-0.43
Private 4-year	-0.24	-0.24	3.04	-0.24
Private 2-year	-0.02	-0.02	-0.02	3.26
Family income $9,000-12,000				
Public 4-year	1.75	-0.21	-0.21	-0.21
Public 2-year	-0.07	1.32	-0.07	-0.07
Private 4-year	-0.12	-0.12	1.27	-0.12
Private 2-year	-0.004	-0.004	-0.004	1.39
Family income $12,000				
Public 4-year	1.18	-0.21	-0.21	-0.21
Public 2-year	-0.07	1.32	-0.07	-0.07
Private 4-year	-0.004	-0.12	1.27	-0.12
Private 2-year	-0.004	-0.004	-0.004	1.39

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[*] Percentage change in enrollment resulting from a $100 decrease in tuition.

Source: SRI.

enrollment expected given a $100 decrease in tuition. For example, a $100 decrease in tuition at public 4-year institutions would increase the enrollment of individuals from families with income between $0 and $6,000 by 7.45%. The off-diagonal elements of each matrix indicate the percentage change in enrollment decreased in one institutional category, given a $100 decrease in tuition at another institutional category. For example, if public 2-year institutions decreased their tuition by $100, the enrollment of students at public 4-year institutions with family income $0-$6,000 would decline by 1.03%. As expected, the magnitude of the estimated enrollment changes decline as the family income increases. Similar matrixes are calculated for each state. The higher the percentage of young adults enrolled in college, the smaller the elasticity estimate calculated from the Radner-Miller equation. That is, the higher the enrollment rate, the more difficult it is to attract additional individuals to enroll. All the potential students already may be enrolled, or at least it is less likely that they will be induced to enroll because of a net price decrease. The direct price response estimates are shown in Table 24 for each state.

Since comparable elasticities for changes in student aid programs were not available by state, the elasticities from the previously cited study by Carlson were transformed into tuition-adjustment factors by income and institutional category for each of the federal student aid programs. These factors are illustrated in Table 25. All the adjustment factors for grants, loans, and work study are less than 1.0, which means that in all cases the enrollment change estimated for a $100 increase in either grants, loans, or work study support is less than the enrollment change expected for a $100 decrease in tuition. Given the uncertainty associated with receiving student aid, this estimated behavior seems correct. A student knows in advance the amount of tuition he will have to pay, but he may not know until he starts classes the amount of aid he will receive. The adjustment factor for grants is much larger than for

Table 24

DIRECT STUDENT PRICE RESPONSE COEFFICIENTS FOR PUBLIC FOUR-YEAR INSTITUTIONS BY STATE AND FAMILY INCOME

State	Family Income Category $0-6,000	 $6,000-$9,000	 $9,000-$12,000	 $12,000+
Alabama	8.26	2.82	1.81	0.88
Alaska	7.27	2.30	1.47	1.02
Arkansas	742	2.64	1.71	1.11
California	7.14	2.57	1.73	1.17
Colorado	4.57	1.83	1.60	1.03
Connecticut	7.73	2.78	1.77	1.24
Delaware	7.33	1.65	1.46	1.13
District of Columbia	6.84	2.41	1.87	1.33
Florida	7.90	2.82	1.90	1.25
Georgia	8.22	2.82	1.84	1.09
Hawaii	4.26	2.06	1.67	1.17
Idaho	5.63	2.41	1.70	1.13
Illinois	7.86	2.63	1.84	1.24
Indiana	7.76	2.68	1.78	1.04
Iowa	8.03	2.93	1.90	1.16
Kansas	6.81	2.41	1.55	1.06
Kentucky	8.05	2.48	1.66	1.06
Louisiana	7.21	2.31	1.55	1.09
Maine	6.77	2.74	1.91	1.19
Maryland	6.94	2.66	1.73	1.19
Massachusetts	7.24	2.58	1.79	1.26
Michigan	6.83	2.49	1.75	1.18
Minnesota	8.05	2.24	1.14	0.56
Mississippi	6.72	2.83	2.03	1.29
Missouri	6.26	2.15	1.62	1.21
Montana	5.24	2.15	1.62	1.16
Nebraska	6.25	2.02	1.61	1.16
Nevada	7.62	1.86	1.27	1.29
New Hampshire	7.73	2.73	1.73	1.09
New Jersey	6.98	2.45	1.78	1.29
New Mexico	6.51	2.29	1.62	1.03
New York	7.89	2.72	1.81	1.24
North Carolina	8.05	2.79	1.88	1.13
North Dakota	5.62	2.24	1.60	1.10
Ohio	7.09	2.47	1.72	1.20
Oklahoma	6.27	2.14	1.64	1.09
Oregon	6.93	2.53	1.68	1.10
Pennsylvania	8.10	2.88	1.84	1.26
Rhode Island	7.08	2.54	1.76	1.21
South Carolina	8.54	2.80	1.79	1.12
South Dakota	6.32	2.20	1.60	1.15
Tennessee	7.62	2.63	1.67	1.07
Texas	7.07	2.61	1.77	1.17
Utah	3.72	1.65	1.57	1.12
Vermont	7.38	2.74	1.72	0.94
Virginia	7.92	2.65	1.74	1.17
Washington	6.57	2.59	1.77	1.17
West Virginia	7.87	2.65	1.62	0.97
Wisconsin	6.39	2.40	1.55	1.14
Wyoming	6.79	2.48	1.72	1.14

Source: SRI.

Table 25

PRICE RESPONSE COEFFICIENT ADJUSTMENT FACTORS BY TYPE OF AID

Institutional Sector	Family Income $0-6,000	$6,000-9,000	$9,000-12,000	$12,000+
Grants				
Public 4-year	0.89	0.21	0.21	0.10
Public 2-year	0.89	0.21	0.21	0.10
Private 4-year	0.79	0.22	0.22	0.10
Private 2-year	0.79	0.22	0.22	0.10
Loan				
Public 4-year	0.48	0.26	0.26	0.03
Public 2-year	0.48	0.26	0.26	0.03
Private 4-year	0.44	0.39	0.39	0.11
Private 2-year	0.44	0.39	0.39	0.11
Work study				
Public 4-year	0.40	0.16	0.16	0.02
Public 2-year	0.40	0.16	0.16	0.02
Private 4-year	0.47	0.28	0.28	0.05
Private 2-year	0.47	0.28	0.28	0.05

Source: Carlson, D., "Student Price Response Coefficients for Grants, Loans, Work-Study Aid, and Tuition Changes: An Analysis of Student Surveys," unpublished manuscript, Department of Agricultural Economics, Univ. of Calif. Davis, November 1974.

loans and work study. This result is not surprising given the obvious advantages of a grant and the preferences of aid officers for awarding grants to new students and for giving loans and work study to continuing students. For all types of aid and for all institutional categories, the adjustment factor becomes smaller as the family income increases. Since the tuition elasticities also decline as family income rises, the enrollment induced by increasing in grants, loans, or work study for higher income young adults is extremely small. These factors are applied within the simulation model to each state's tuition elasticities as described above to yield estimates of elasticities for each of the three types of student aid.

Independent Students

Independent students make up nearly 20% of the FTE undergraduate degree-credit enrollment. Dependent and independent students must be analyzed separately because the two groups have different sets of resources and living expenses. No single criterion exists for defining an independent student. The BEOG programs' definition is used because it is the most widely accepted criterion for awarding federal, state, and institutional funds. That definition describes an independent student as one who:

(1) Has not and will not be claimed as an exemption for federal income tax purposes by any person except himself or his spouse for the calendar year prior to the academic year for which aid is requested.

(2) Has not received and will not receive financial assistance of more than $600 from his or her parents in the calendar years in which aid is requested.

(3) Has not lived or will not live for more than two consecutive weeks in the house of a parent during the calendar year in which aid is received and the calendar year prior to the academic year for which aid is requested.

Based on this definition of an independent student and the data described in the previous section, the estimated number of independent students by type of institution is shown in Table 26. Over half the independent students are in public four-year institutions. Relative to total enrollment, however, the greatest percentage of students classified as independent are in the public two-year institutions.

Table 26

NATIONAL ESTIMATE OF INDEPENDENT STUDENTS BY TYPE OF INSTITUTION

Institutional Category	Independent Students	Total FTE Undergraduates	Percent Independent
Public 4-year	597,247	2,975,158	20.1%
Public 2-year	348,052	1,100,509	31.6
Private 4-year	138,500	1,320,207	10.5
Private 2-year	8,619	82,264	10.5
Total	1,092,418	5,478,138	19.9%

Source: A. Hershberger et al., The Development of the Data Base for "Student Aid: Description and Options," SRI, 1975.

The percentage of total undergraduate enrollment estimated to be independent according to the BEOG definition varies significantly across states as shown in Table 27. Indiana and Pennsylvania both have only 8% independent students, while six states have more than 25% independent students (Alaska, California, Florida, Hawaii, New York, and Texas). Because of the magnitude of these percentages and their dispersion over states, it is important to consider how this large segment of the student population would be analyzed for the purpose of distributing student aid.

Table 27

NUMBER OF INDEPENDENT STUDENTS BY STATE

State	Independent Students	Percentage of Total FTE Undergraduates
Alabama	16,212	20%
Alaska	2,521	43
Arizona	8,247	14
Arkansas	9,299	22
California	187,198	30
Colorado	9,623	12
Connecticut	12,820	16
Delaware	3,068	19
District of Columbia	5,139	15
Florida	44,762	28
Georgia	20,583	22
Hawaii	8,614	36
Idaho	4,993	21
Illinois	50,667	19
Indiana	11,075	8
Iowa	11,680	16
Kansas	14,616	19
Kentucky	16,187	22
Louisiana	15,182	15
Maine	3,484	15
Maryland	13,442	15
Massachusetts	25,606	13
Michigan	46,631	20
Minnesota	16,517	15
Mississippi	6,797	12
Missouri	24,731	21
Montana	4,159	19
Nebraska	8,003	17
Nevada	1,919	22
New Hampshire	4,511	18
New Jersey	21,430	16
New Mexico	7,040	23
New York	149,270	29
North Carolina	16,406	14
North Dakota	3,266	15
Ohio	42,281	17
Oklahoma	11,790	14
Oregon	15,297	24
Pennsylvania	22,161	8
Rhode Island	4,840	15
South Carolina	8,637	14
South Dakota	4,029	18
Tennessee	18,255	17
Texas	81,001	26
Utah	9,035	16
Vermont	2,599	14
Virginia	17,958	18
Washington	23,051	21
West Virginia	5,143	11
Wisconsin	18,907	15
Wyoming	1,747	18

Source: SRI.

The simulation model is designed so that the process of student aid distribution to independent students can be incorporated into the analysis in three different ways, as outlined below:

(1) The independent students can be left out of the analysis. That is, the distribution of student aid may be estimated solely on the basis of the number and distribution of dependent students by family income and type of institution attended. Elimination of the independent students from the analysis makes it possible to examine the different impacts of alternative federal student aid program on dependent students for which more detailed data exist by parental income and types of institutions.

(2) The independent students may be distributed across family income categories in the same percentages as dependent students. This procedure, therefore, leaves the distribution of enrollment across family income categories the same as the dependent students but increases the total number of students to include all undergraduate, degree-credit students. With the current data available on independent students, this procedure for categorizing independent students by income may be as good as any other approximation. It should be noted that for the purpose of distributing student aid the independent students should be placed into "parental income" categories not on the basis of their income but on the basis of their need. Independent students are taxed at a higher rate than are the parents of dependent students. An independent student with an income of $3,000 is expected to contribute all of this income to his education (except for an amount sufficient for living expenses during the summer months), while a dependent student's parents with incomes of $3,000 are expected to contribute only $270 toward the student's eudcation. This latter contribution is at less than a 10% tax rate.

(3) The independent students may be categorized across parental income levels according to their gross financial need and then added with the dependent students in each of the family income categories. For example, the range of

gross financial need of dependent students with family income between $0-$6,000 is $2,660 to $3,000. For independent students, it has been estimated that approximately 20% have gross financial need of $2,660 to $3,000. Similar comparisons of gross financial need have been calculated for the other family income categories, and the resulting distribution of independent students according to parental income categories is shown in Table 28. This estimated distribution assumes that financial aid officers use a similar procedure to that described above for determining the need of, and the amount of aid awarded to, independent students.

Legislative Regulations for Student Aid Programs

The federal government has the following three levels of control over the distribution of student aid:

(1) The total number of dollars appropriated for student financial assistance.

(2) The percentage of the total amount of aid split between alternative programs.

(3) The rules and regulations governing each individual program.

Beyond these parameters, the actual distribution of federal student aid dollars depends on the decisions made by thousands of colleges and universities and by millions of students. The effects of student and institutional decisions on the distribution of student aid have been discussed. This section outlines in more detail the decision parameters that the federal government has at its disposal to influence the distribution of student aid. The simulation model has been designed to incorporate many of these decision parameters into the procedure for determining how the aid funds are distributed. The model therefore can be used to estimate the likely impacts on aid distributions of changes in any of the federal government's decision parameters.

Table 28

ESTIMATED INCOME DISTRIBUTION OF INDEPENDENT STUDENTS FOR STUDENT AID DISTRIBUTION

Parental Income Category	Range of Financial Need*		Percentage of Independent Students	Percentage of FTE Dependent Students
	Low	High		
$0-6,000	2,660	3,000	20.0%	20.3%
$6,000-9,000	2,538	2,660	10.0	20.6
$9,000-12,000	2,450	2,538	5.0	20.5
$12,000 +	0	2,450	65.0	38.3

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*Based on a total cost of $3,000 and the Office of Education expected parental contribution schedule given in Table 4.

Source: A. Hershberger et al., 1975.

The following decision parameters for each aid program have been incorporated into the simulation model:

(1) Total dollars to be appropriated.

(2) Type of students eligible: full-time, part-time, FTE, BEOG recipients, all students.

(3) Income cutoff level for eligibility: for example, students with family incomes greater than $12,000 are not eligible to receive aid under the program.

(4) Maximum grant size in dollars: for example, no students can receive a grant of more than $1,000.

(5) Maximum grant size as a percentage of the total cost of attendance: for example, no student can receive a grant exceeding 50% of the total attendance costs.

(6) Eligible institutional categories: for the institutional-based programs, restrictions may be placed on the types of institutions that may participate. For the noninstitutional-based programs, restrictions may be placed on the colleges at which aid recipients may enroll.

(7) Parental contribution schedules: as discussed before, since several different expected parental contribution schedules have been proposed and are being used, the simulation model provides for alternative schedules to be specified.

(8) Institutional matching percentages: for example, institutions are required to match 100% of the federal SEOG dollars and 20% of the CWS federal dollars.

(9) Aid packaging procedures: for example, CWS to be distributed after SEOG or SEOG distributed after BEOG.

(10) Intermediate state allocations: for example, on the basis of full-time enrollment, FTE enrollment, low-income population, education effort index, high school graduates.

For grant types of aid programs, the above list of decision parameters is fairly complete. For work study programs, it is less complete since detailed specifications of the types of work on or off campus that qualify are not included. For loan programs, the list is also incomplete since interest rates, repayment plans, and default procedures are not included. Sufficiently detailed information does not currently exist to suggest differences in behavior resulting from variations in these excluded parameters.

The simulation model as currently designed does include a fairly large number of policy parameters. The purpose of the model is to simulate the distribution of student aid across states and institutional and family income categories for alternative specifications of all these parameters.

IV ANALYTICAL PROCEDURE FOR TUITION CHANGES

Although the main purpose of the simulation model is to assess the impact of alternative federal student aid programs, it is useful for many analyses to include alternative assumptions about tuition levels at the various categories of institutions. Tuition changes directly influence student aid distributions in several ways. First, as discussed in Chapter III, students and potential students respond to price changes; therefore, tuition changes will influence the number of students available to participate in student aid programs. Second, tuition changes affect the calculated level of financial need as discussed in Chapter I.

Tuition policy is a crucial consideration for student aid policies which are made by thousands of institutions. Hence, it is very difficult for the federal government to anticipate how institutions and states (in the case of public institutions) will respond to federal student aid program changes. For example, will large increases in the funding level of aid programs aimed at providing financial assistance to a larger number of students simply be eroded by large increases in tuition that raise the amount of financial need per student and therefore increase the average award granted? For this type of situation and other similar issues, it is useful to simulate the impact of federal programs using different assumptions about tuition policies in the future.

The simulation model estimates the change in FTE undergraduate, degree-credit enrollment resulting from a tuition change for any of the institutional sectors. These estimates are based on the price response coefficients described in Chapter III. It should be noted that the price response coefficients include both direct and indirect price effects.

This is, a tuition change in one institutional category will influence the enrollment in other institutional sectors.

Since increased tuitions may result in an increase of institutional or state student aid programs, a procedure has been developed to calculate the enrollment change likely to result from some percentage of the tuition increases being redistributed to students on the basis of financial nee[illegible]

The detailed algebraic equations for the tuition analysis are shown below.

[1] $TC_i^s = P_i^s - T_i^s \qquad i = 1, \ldots, I$

[2] $NS_{im}^t = NS_{im}^b \left(1 - \sum_{j=1}^{J} \delta_{ijm}^s \, TC_j^s\right) \qquad i = 1, \ldots, I; \quad m = 1, \ldots, M$

[3] $\sum_{m=1}^{M} NS_{im}^a \, TG_{im}^s = \sum_{m=1}^{M} NS_{im}^a \, TC_i^s \, PT_i^s \qquad i = 1, \ldots, M$

[4] $NS_{im}^a = NS_{im}^t \left(1 + \sum_{j=1}^{J} \propto_{ijm}^s \, TG_{jm}^s\right) \qquad i = 1, \ldots, I; \quad m = 1, \ldots, M$

[5] $TG_{im}^s = DG \, (TB_i^s - PC_m)$ if $(TB_i^s - PC_m) > 0$

$= 0$ otherwise

[6] When $TG_{im}^s > MDG$ or $TG_{im}^s \geq MPG \cdot TB_i^s$

set $TG_{im}^s = MDG$ or $TG_{im}^s = MPG \cdot TB_i^s$, respectively,

subtract $(NS_{im}^a \cdot TG_{im}^s)$ from the right hand side of equation [3], and

resolve equations [3] - [6].

Where: T_i^s = Baseline tuition level for institutional category i for the state being analyzed.

P_i^s = New tuition level for institutional category i for the state being analyzed.

TC_i^s = Tuition change for institutional category i for the state being analyzed.

δ_{ijm}^s = Percentage change in enrollment for institutional category i and parental income category m given a $1 tuition decrease for institutional category j for the state being analyzed.

NS_{im}^b = Baseline enrollment for institutional category i and parental income category m for the state being analyzed.

NS_{im}^t = Enrollment after the tuition change for institutional category i and parental income category m for the state being analyzed.

PT_i^s = Percentage of additional tuition revenues to be redistributed as student aid for institutional category i for the state being analyzed.

NS_{im}^a = Enrollment after the distribution of student aid from tuition revenue for institutional category i and parental income category m for the state being analyzed.

TG_{im}^s = Additional dollars per student of aid from tuition revenues for institutional category i and parental income category m for the state being analyzed.

α_{ijm}^s = Percentage change in enrollment for institutional category i and parental income category m given a $1 per student grant increase for institutional category j for the state being analyzed.

TB_i^s = Average total student budget for attending an institution in category i for the state being analyzed.

PC_m = Expected parental contribution for parental income category m.

MDG = Maximum dollars per student of grant aid to be awarded.

MPG = Maximum grant per student as a percentage of total cost of attendance to be awarded.

DG = Proportionality constant for distributing student grants over income categories.

V ANALYTICAL PROCEDURE FOR STUDENT AID PROGRAM MODIFICATIONS

For the need-based, institutional student aid programs, the procedure developed in the simulation model includes all the dimensions discussed so far. Basically, the average amount of aid per student is determined from the following relationship:

$$\begin{pmatrix}\text{Average aid}\\ \text{per student}\end{pmatrix} \propto \left[\begin{pmatrix}\text{Total}\\ \text{student}\\ \text{budget}\end{pmatrix} - \begin{pmatrix}\text{Expected}\\ \text{parental}\\ \text{contribution}\end{pmatrix} - \begin{pmatrix}\text{Current}\\ \text{aid}\end{pmatrix}\right] \times \begin{pmatrix}\text{Adjustment}\\ \text{factor}\end{pmatrix}$$

In addition to this equation, the average aid per student must not violate any of the rules and regulations specified in the legislation for the particular program. For example, maximum award sizes are enforced as are institutional matching requirements. The adjustment factors reflect the influence of financial aid officers and institutional competition effects on the aid distribution as described in Chapter III. The proportionality term in the above equation indicates that a scale factor must be calculated that will force equality between the average aid per student times the number of students and the total funds appropriated to the specific program.

Since the simulation model is designed to analyze a package of up to three programs simultaneously, the student aid distribution procedure involves solving a set of three simultaneous, nonlinear equations.*

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*The procedure used to solve this set of equations is Newton's Method for Systems described in S. D. Conte, Elementary Numerical Analysis - An Algorithmic Approach, McGraw-Hill Series in Information Processing and Computers, New York, 1965.

All the detailed equations for the student aid distribution calculations are given below. The variables used in the equations are defined at the end of the equation section.

Equations for Distribution Procedure

[1] Average per student state grant times the number of students must equal the total amount of state grants:

$$\sum_{i \epsilon I} \sum_{m=1}^{M} NS_{im}^{s} \cdot GS_{im} = \overline{GS}$$

[2] Average per student state loan times the number of students must equal the total amount of state loans:

$$\sum_{i \epsilon I} \sum_{m=1}^{M} NS_{im}^{s} \cdot LS_{im} = \overline{LS}$$

[3] Average per student state work study support times the number of students must equal the total amount of state work study aid:

$$\sum_{i \epsilon I} \sum_{m=1}^{M} NS_{im}^{s} \cdot WS_{im} = \overline{WS}$$

[4] Average per student federal grant times the number of students must equal the total amount of federal grants:

$$\sum_{i \epsilon I} \sum_{m=1}^{M} (NS_{im}^{s} \cdot GS_{im}) + (NN_{im}^{s} \cdot GN_{im}) = \overline{GN}$$

[5] Average per student federal loan times the number of students must equal the total amount of federal loans:

$$\sum_{i \epsilon I} \sum_{m=1}^{M} (NS_{im}^{s} \cdot LS_{im}) + (NN_{im}^{s} \cdot LN_{im}) = \overline{LN}$$

[6] Average per student federal work study support times the number of students must equal the total amount of federal work study aid:

$$\sum_{i \epsilon I} \sum_{m=1}^{M} (NS_{im}^{s} \cdot WS_{im}) + (NN_{im}^{s} \cdot WN_{im}) = \overline{WN}$$

[7] Calculation of the enrollment change induced by the student aid package for the state being analyzed:

$$NS_{im}^{s} = NS_{im}^{a} (1 + \sum_{j} \alpha_{ijm}^{s} GS_{jm} + \sum_{j} \beta_{ijm}^{s} LS_{jm} + \sum_{j} \gamma_{ijm}^{s} WS_{jm})$$

[8] Calculation of the enrollment change induced by the student aid package for the rest of the nation:

$$NN^{s}_{im} = NN^{a}_{im}\ (1 + \sum_{j} \alpha^{n}_{ijm}\ GN_{jm} + \sum_{j} \beta^{n}_{ijm}\ LN_{jm} + \sum_{j} \gamma^{n}_{ijm}\ WN_{im})$$

[9] Average per student state grant:

$$GS_{im} = DG \cdot (TB^{s}_{i} - PC_{m} - CA_{im}) \cdot AG_{im} \quad \text{if} \quad (TB^{s}_{v} - PC_{m} - CA_{im}) > 0$$

$$GS_{im} = 0 \quad \text{if} \quad (TB^{s}_{i} - PC_{m} - CA_{im}) \leq 0$$

[10] Average per student state loan:

$$LS_{im} = DL \cdot (TB^{s}_{i} - PC_{m} - CA_{im}) \cdot AL_{im} \quad \text{if} \quad (TB^{s}_{i} - PC_{m} - CA_{im}) > 0$$

$$LS_{im} = 0 \quad \text{if} \quad (TB^{s}_{i} - PC_{m} - CA_{im}) \leq 0$$

[11] Average per student state work study support:

$$WS_{im} = DW \cdot (TB^{s}_{i} - PC_{m} - CA_{im}) \cdot AW_{im} \quad \text{if} \quad (TB^{s}_{i} - PC_{m} - CA_{im}) > 0$$

$$WS_{im} = 0 \quad \text{if} \quad (TB^{s}_{i} - PC_{m} - CA_{im}) \leq 0$$

[12] Average per student federal grant:

$$GN_{im} = DG \cdot (TB^{s}_{i} - PC_{m} - CA_{im}) \cdot AG_{im} \quad \text{if} \quad (TB^{s}_{i} - PC_{m} - CA_{im}) > 0$$

$$GN_{im} = 0 \quad \text{if} \quad (TB^{s}_{i} - PC_{m} - CA_{im}) \leq 0$$

[13] Average per student federal loan:

$$LN_{im} = DL \cdot (TB^{s}_{i} - PC_{m} - CA_{im}) \cdot AL_{im} \quad \text{if} \quad (TB^{s}_{i} - PC_{m} - CA_{im}) > 0$$

$$LN_{im} = 0 \quad \text{if} \quad (TB^{s}_{i} - PC_{m} - CA_{im}) \leq 0$$

[14] Average per student federal work study support:

$$WN_{im} = DW \cdot (TB^{s}_{i} - PC_{m} - CA_{im}) \cdot AW_{im} \quad \text{if} \quad (TB^{s}_{i} - PC_{m} - CA_{im}) > 0$$

$$WN_{im} = 0 \quad \text{if} \quad (TB^{s}_{i} - PC_{m} - CA_{im}) \leq 0$$

Iterative Procedure for Award Maximums:

[15] State grant maximums:

when $GS_{im} > MDG$

or $GS_{im} > MPG \cdot TB_i^s$

set $GS_{im} = MDG$ or $GS_{im} = MPG \cdot TB_i^s$ respectively

and $\overline{GS} = \overline{GS} - (NS_{im}^s \cdot GS_{im})$ and resolve equations [1] - [14]

[16] State loan maximums:

when $LS_{im} > MDL$

or $LS_{im} > MPL \cdot TB_i^s$

set $LS_{im} = MDL$ or $LS_{im} = MPL \cdot TB_i^s$ respectively

and $\overline{LS} = \overline{LS} - (NS_{im}^s \cdot LS_{im})$ and resolve equations [1] - [14]

[17] State work study support maximums:

when $WS_{im} > MDW$

or $WS_{im} > MPW \cdot TB_i^s$

set $WS_{im} = MDW$ or $WS_{im} = MPW \cdot TB_i^s$ respectively

and $\overline{WS} = \overline{WS} - (NS_{im}^s \cdot WS_{im})$ and resolve equations [1] - [14]

[18] Federal grant maximums:

when $GN_{im} > MDG$

or $GN_{im} > MPG \cdot TB_i^s$

set $GN_{im} = MDG$ or $GN_{im} = MPG \cdot TB_i^s$ respectively

and $GN = GN - (NN_{im}^s \cdot GN_{im})$ and resolve equations [1] - [14]

[19] Federal loan maximums:

when $LN_{im} > MDL$

or $LN_{im} > MPL \cdot TB_i^s$

set $LN_{im} = MDL$ or $LN_{im} = MPL \cdot TB_i^s$ respectively

and $\overline{LN} = \overline{LN} - (NN_{im}^s - LN_{im})$ and resolve equations [1] - [14]

[20] Federal work study support maximums:

when $WN_{im} > MDW$

or $WN_{im} > MPW \cdot TB_i^s$

set $WN_{im} = MDW$ or $WN_{im} = MPW \cdot TB_i^s$ respectively

and $WN = WN - (NN_{im}^s - WN_{im})$ and resolve equations [1] - [14]

[21] Institutional matching requirement maximum:

when $\sum\limits_{m=1}^{M} NS_{im}^s \cdot (PMG \cdot GS_{im} + PML \cdot LS_{im} + PMW \cdot WS_{im}) > IA_i^s \cdot PA_i^s$

or $\sum\limits_{m=1}^{M} NS_{im}^s (PMG \cdot GN_{im} + PML \cdot LN_{im} + PMW \cdot WN_{im}) > IA_i^n \cdot PA_i^n$

set $GS_{im} = GS_{im} \cdot (IA_i^s \cdot PA_i^s)/(PMG \cdot GS_{im} + PML \cdot LS_{im} + PMW \cdot WS_{im})$

$LS_{im} = LS_{im} \cdot (IA_i^s \cdot PA_i^s)/(PMG \cdot GS_{im} + PML \cdot LS_{im} + PMW \cdot WS_{im})$

$WS_{im} = WS_{im} . (IA_i^s . PA_i^s)/(PMG . GS_{im} + PML . LS_{im} + PMW . WS_{im})$

$GN_{im} = GN_{im} \cdot (IA_i^n \cdot PA_i^n)/(PMG \cdot GN_{im} + PML \cdot LN_{im} + PMW \cdot WN_{im})$

$LN_{im} = LN_{im} \cdot (IA_i^n . PA_i^n)/(PMG . GN_{im} + PML . LN_{im} + PMW . WN_{im})$

$WN_{im} = WN_{im} \cdot (IA_i^n . PA_i^n)/(PMG . GN_{im} + PML . LN_{im} + PMW . WN_{im})$

$\overline{GS} = \overline{GS} - (NS_{im}^s . GS_{im})$

$\overline{LS} = \overline{LS} - (NS_{im}^s . LS_{im})$

$\overline{WS} = \overline{WS} - (NS_{im}^s . WS_{im})$

$\overline{GN} = \overline{GN} - (NN_{im}^s . GN_{im})$

$\overline{LN} = \overline{LN} - (NN_{im}^s . LN_{im})$

$\overline{WN} = \overline{WN} - (NN_{im}^s . WN_{im})$

Definition of Variables

[1] NS^a_{im} = Baseline enrollment for institutional category i and parental income category m for the state being analyzed.

[2] NN^a_{im} = Baseline enrollment for institutional category i and parental income category m for the rest of the nation.

[3] NS^s_{im} = Enrollment after the distribution of student aid from federal or state source for institutional category i and parental income category m for the state being analyzed.

[4] NN^s_{im} = Enrollment after the distribution of student aid from federal sources for institutional category i and parental income category m for the rest of the nation.

[5] GS_{im} = Additional dollars per student of federal or state grants for institutional category i and parental income category m for the state being analyzed.

[6] LS_{im} = Additional dollars per student of federal or state loans for institutional category i and parental income category m for the state being analyzed.

[7] WS_{im} = Additional dollars per student of federal or state work study support for institutional category i and parental income category m for the state being analyzed.

[8] GN_{im} = Additional dollars per student of federal grants for institutional category i and parental income category m for the rest of the nation.

[9] LN_{im} = Additional dollars per student of federal loans for institutional category i and parental income category m for the rest of the nation.

[10] WN_{im} = Additional dollars per student of federal work study support for institutional category i and parental income category m for the rest of the nation.

[11] $\overline{GS}$ = Additional dollars of student grants from the state being analyzed.

[12] $\overline{LS}$ = Additional dollars of student loans from the state being analyzed.

[13] $\overline{WS}$ = Additional dollars of student work study support from the state being analyzed.

[14] $\overline{GN}$ = Additional dollars of student grants from federal sources.

[15] $\overline{LN}$ = Additional dollars of student loans from federal sources.

[16] $\overline{WN}$ = Additional dollars of student work study support from federal sources.

[17] α^s_{ijm} = Percentage change in enrollment for institutional category i and parental income category m given a $1 per student grant increase for institutional category j for the state being analyzed.

[18] α^n_{ijm} = Percentage change in enrollment for institutional category i and parental income category m given a $1 per student grant increase for institutional category j for the rest of the nation.

[19] β^s_{ijm} = Percentage change in enrollment for institutional category i and parental income category m given a $1 per student loan increase for institutional category j for the state being analyzed.

[20] β^n_{ijm} = Percentage change in enrollment for institutional category i and parental income category m given a $1 per student loan increase for institutional category j for the rest of the nation.

[21] γ^s_{ijm} = Percentage change in enrollment for institutional category i and parental income category m given a $1 per student work study support increase for institutional category j for the state being analyzed.

[22] γ^n_{ijm} = Percentage change in enrollment for institutional category i and parental income category m given a $1 per student work study support increase for institutional category j for the rest of the nation.

[23] DG = Proportionality constant for distributing student grants over institutional and income categories.

[24] DL = Proportionality constant for distributing student loans over institutional and income categories.

[25] DW = Proportionality constant for distributing student work study support over institutional and income categories.

[26] TB^s_i = Average total student budget for attending an institution in category i for the state being analyzed.

[27] TB^n_i = Average total student budget for attending an institution in category i for the rest of the nation.

[28] PC_m = Expected parental contribution for parental income category m.

[29] CA_{im} = Current amount of student aid available from all or selected federal, state, and institutional sources for students in institutional category i and parental income category m.

[30] AG_{im} = Student grant distribution adjustment factor for students in institutional category i and parental income category m (see Chapter III).

[31] AL_{im} = Student loan distribution adjustment factor for students in institutional category i and parental income category m (see Chapter III).

[32] AW_{im} = Student work study support distribution adjustment factor for students in institutional category i and parental income category m (see Chapter III).

[33] MDG = Maximum dollars per student of grant aid to be awarded

[34] MDL = Maximum dollars per student of loan aid to be awarded.

[35] MDW = Maximum dollars per student of work study aid to be awarded.

[36] MPG = Maximum grant per student as a percentage of total cost of attendance to be awarded.

[37] MPL = Maximum loan per student as a percentage of total cost of attendance to be awarded.

[38] MPW = Maximum work study support per student as a percentage of total cost of attendance to be awarded.

[39] PMG = Percentage of institutional matching requirement for a grant program.

[40] PML = Percentage of institutional matching requirement for a loan program.

[41] PMW = Percentage of institutional matching requirement for a work study program.

[42] IA_i^s = Total amount of institutional student aid resources in institutional category i for the state being analyzed.

[43] IA_i^n = Total amount of institutional student aid resources in institutional category i for the rest of the nation.

[44] PA_i^s = Percentage of institutional student aid resources available for matching purposes in institutional category i for the state being analyzed.

[45] PA_i^n = Percentage of institutional student aid resources available for matching purposes in institutional category i for the rest of the nation.

The system of equations must be solved once for each package of student aid. A student aid package, as described earlier, includes, at most, one grant program, one loan program, and one work study program. All the programs in one package must be either federal or state. For situations involving several aid packages, the system of equations outlined above is solved repetitively, once for each package. The new enrollment distribution from the solution for the first package becomes the initial enrollment for the calculation of the second package and so on. The slight inaccuracy resulting from this iterative procedure instead of a simultaneous solution does not seem serious enough to warrant the greatly increased complexities of developing the model to handle multiple packages simultaneously. Also, the majority of analyses run with the model involve only a single package, if not only a single program. The magnitude of the inaccuracy is very small as illustrated below:

Let E_o = baseline enrollment
E_a = enrollment after grant a
E_b = enrollment after grants a and b sequentially
E_c = enrollment after grants a and b simultaneously
α = price response coefficient for a grant
A = per student grant a
B = per student grant b

then $E_a = E_o\ (1 + \alpha A)$

$E_b = E_a\ (1 + \alpha B)$
$E_c = E_o\ (1 + \alpha A + \alpha B)$

but $E_b = E_o\ (1 + \alpha A)(1 + \alpha B)$

$= E_o\ (1 + \alpha^2\ AB)$

therefore E_b differs from E_c by $\alpha^2\ AB$

if $\alpha = 0.0001$
$A = 100$
$B = 100$

then $E_c = E_o\ (1.02)$

and $E_b = E_o\ (1.0201)$ since $\alpha^2\ AB = 0.0001$.

VI ILLUSTRATIVE ANALYSES OF ALTERNATIVE STUDENT AID PROGRAM SPECIFICATIONS

To illustrate how the data base and simulation model can be effectively used for policy analysis, specific federal student aid program modifications are analyzed in this chapter. In addition to providing examples of how the simulation model can produce useful policy information, these analyses yield some interesting insights into the distributions of the BEOG, CWS, and SEOG programs.

The BEOG Program: An Analysis of Alternative Maximum Grant Specifications

The BEOG program as currently specified has two types of constraints that limit the maximum amount of the grant that any student may receive. The first constraint is that the size of the basic grant should be equal to $1,400 minus the expected parental contribution for the student. Using the expected parental contribution schedule shown in Table 29, the grant amounts per student, by family income categories and by type of institution attended, are given in Table 30. Obviously, these grant amounts do not vary by type of institution, but this format is useful for later comparisons of grant maximums.

The second constraint is that the size of the grant cannot exceed 50% of the total cost of attendance. Using the total student budget figures in Table 31 for 1972-73, the maximum grant amounts are given in Table 32 by family income and institutional categories. Obviously, this constraint on grant size does not vary across family income categories.

Examination of Tables 30 and 32 together show that the $1,400 minus expected parental contribution amount is the effective determinant of

Table 29

EXPECTED PARENTAL CONTRIBUTION SCHEDULE

Family Income	Institutional Category	Expected Parental Contribution Schedule
$0-6,000	All	$ 270
6,000-9,000	All	410
9,000-12,000	All	515
12,000 +	Public 4-year	2,250
12,000 +	Public 2-year	2,125
12,000 +	Private 4-year	2,384
12,000 +	Private 2-year	2,250

Source: Office of Education memoranda (unpublished) on parental contribution, 1974.

Table 30

$1,400 MINUS EXPECTED PARENTAL CONTRIBUTION

Institutional Category	Family Income			
	$0-6,000	$6,000-9,000	$9,000-12,000	$12,000 +
Public 4-year	$1,130	$990	$885	$--
Public 2-year	1,130	990	885	--
Private 4-year	1,130	990	885	--
Private 2-year	1,130	990	885	--

Source: SRI.

Table 31

NATIONAL AVERAGES OF TOTAL STUDENT BUDGETS

Institutional Sector	Student Budget
Public 4-year	$2,580
Public 2-year	2,177
Private 4-year	4,018
Private 2-year	2,966

Source: Tripartite student aid application data for 1972-73.

Table 32

ONE-HALF OF THE TOTAL COST OF ATTENDANCE
1972-1973

Institutional	Family Income			
Category	$0-6,000	$6,000-9,000	$9,000-12,000	$12,000 +
Public 4-year	$1,290	$1,290	$1,290	$1,290
Public 2-year	1,088	1,088	1,088	1,088
Private 4-year	2,009	2,009	2,009	2,009
Private 2-year	1,483	1,483	1,483	1,483

Source: SRI.

grant size except for the $0-6,000 income students attending public two-year colleges. For these students, the one-half cost of attendance amount ($1,088) is less than the $1,400 less the expected parental contribution amount ($1,130).

If the $1,400 parameter in the specification of the BEOG program is increased to $1,600, the maximum grant size is then determined by the amounts shown in Tables 32 and 33. With this increase, several other sectors of students would have their grants limited by the half cost constraint. The $0-$6,000 income students attending public four-year institutions and the $0-$9,000 income students attending public two-year institutions would be constrained by cost rather than by the $1,600 minus expected parental contribution criteria. As expected, by increasing the $1,400 parameter while maintaining the half cost constraint, the BEOG grant size is increased for private institutions relative to public institutions and public four-year colleges relative to public two-year ones. The estimated distribution of BEOG grant dollars by institutional categories for these two specifications of the program are shown in Table 34. As evident from this table, the change in the distribution is not dramatic since the percentage of BEOG dollars going to public two-year institutions declines by only 1.9% (27.8% to 25.9%), while the private four-year share increases by only 0.8% (22.4% to 23.2%).

Also of interest are two other dimensions resulting from these simulated effects of changing the $1,400 parameter to $1,600. First, the level of funding necessary for the BEOG program increases 15% ($380.5 million to $438.4 million) without including a possible induced level of applicants, given an increase in the grant size. Second, the distribution of BEOG grant dollars also shifts across family income categories as shown in Table 35. The percentage of funds going to students with family incomes of $0-$6,000 decreases by 1.8 percentage points (52.5% to 50.7%), while the $6,000-$9,000 category increases by 0.5 percentage points (27.4% to 27.9%), and the $9,000-$12,000 group increases by 1.3 points (20.1% to 21.4%). This income shift is expected in light of the apparent shift toward private institutions and away from public two-year colleges.

Table 33

$1,600 MINUS EXPECTED PARENTAL CONTRIBUTION

Institutional Category	Family Income			
	$0-6,000	$6,000-9,000	$9,000-12,000	$12,000 +
Public 4-year	$1,330	$1,190	$1,085	$--
Public 2-year	1,330	1,190	1,085	--
Private 4-year	1,330	1,190	1,085	--
Private 2-year	1,330	1,190	1,085	--

Source: SRI, p. 29.

A second variation on the specification of the BEOG program that has been analyzed is the shift from a half cost of attendance constraint on the grant size to a half of gross need constraint. Gross need for this purpose is defined as the total cost of attendance minus the expected parental contribution. The half of gross need figures are shown in Table 36. The comparison between Tables 30 and 36 indicates that the half of gross need limits become the effective grant maximums for all of the public two-year student categories only. For all other students, the $1,400 minus expected parental contribution figure becomes the effective maximum. Using gross need rather than total cost of attendance places more severe limits on the BEOG grants available to students attending public two-year institutions. As shown in Table 34, this change in the specification of the BEOG program reduces the percentage of dollars going to public two-year colleges by 2.2% (27.8% to 25.6%), increases the percentage of funds going to private four-year institutions by 0.7% (22.4% to 23.1%), and increases the percentage of funds going to public four-year schools by 1.3% (43.2% to 44.5%). As shown in Table 35, this program specification change is estimated to have very little effect on the

Table 34

ESTIMATED DISTRIBUTIONS OF BEOG DOLLARS BY CATEGORIES OF INSTITUTIONS UNDER ALTERNATIVE SPECIFICATIONS OF THE PROGRAM

Program Specification	Percentage of Total BEOG Dollars				Total BEOG Dollars (millions)
	Public 4-Year	Public 2-Year	Private 4-Year	Private 2-Year	
$1,400-EPC and 1/2 cost[*]	43.2%	27.8%	22.4%	6.5%	$380.5
1/2 cost only	39.4	21.8	31.9	6.8	592.5
1/2 gross need only[†]	38.5	20.1	34.5	6.9	467.2
$1,400-EPC and 1/2 gross need	44.5	25.6	23.1	6.7	369.3
$1,600-EPC and 1/2 cost	44.1	25.9	23.2	6.8	438.4
$1,600-EPC and 1/2 gross need	43.8	23.5	25.3	7.4	402.3
$1,400-EPC[‡] and 1/2 cost	43.0	28.2	22.3	6.5	246.0
Alternative applicant base[§]	46.7	26.8	21.5	5.0	549.3

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[*] Grant size equals ($1,400 minus expected parental contribution) but cannot exceed half of the total cost of attendance.

[†] Gross need = total cost of attendance minus expected parental contribution.

[‡] Based on an alternative expected parental contribution schedule as follows:

$0-6,000	$500
6,000-9,000	672
9,000-12,000	1,302
12,000+	2,426

[§] Recipients based on an increase of 5% of the FTE undergraduates over the 1974-75 estimate of BEOG applicants.

Source: SRI.

Table 35

ESTIMATED DISTRIBUTIONS OF BEOG DOLLARS BY FAMILY INCOME CATEGORIES UNDER ALTERNATIVE SPECIFICATIONS OF THE PROGRAM

Program Specification	Percentage of Total BEOG Dollars				Total BEOG Dollars (millions)
	$0-6,000	$6,000-9,000	$9,000-12,000	$12,000 +	
$1,400-EPC or 1/2 cost[*]	52.5%	27.4%	20.1%	-- %	$380.5
1/2 cost only	42.4	25.0	20.5	12.1	592.5
1/2 gross need only[†]	48.6	27.1	21.2	3.1	467.2
$1,400-EPC and 1/2 gross need	52.3	27.4	20.3	--	369.3
$1,600-EPC and 1/2 cost	50.7	27.9	21.4	--	438.4
$1,600-EPC and 1/2 gross need	51.0	27.7	21.3	--	402.3
$1,400-EPC[‡] and 1/2 cost	65.4	31.2	3.4	0.0	246.0
Alternative applicant base[§]	47.9	29.2	22.9	--	549.3

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[*] Grant size equals ($1,400 minus expected parental contribution) but cannot exceed half of the total cost of attendance.

[†] Gross need = total cost of attendance minus expected parental contribution.

[‡] Based on an alternative expected parental contribution schedule as follows:

$0-6,000	$500
6,000-9,000	672
9,000-12,000	1,302
12,000+	2,426

[§] Recipients based on an increase of 5% of the FTE undergraduates over the 1974-75 estimate of BEOG applicants.

Source: SRI.

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Table 36

ONE-HALF GROSS NEED (TOTAL COST MINUS EXPECTED PARENTAL CONTRIBUTION)

Institutional Category	Family Income $0-6,000	$6,000-9,000	$9,000-12,000	$12,000 +
Public 4-year	$1,155	$1,085	$1,032	$164
Public 2-year	954	884	831	--
Private 4-year	1,874	1,804	1,752	883
Private 2-year	1,348	1,278	1,226	357

Sources: Tables 29 and 31.

distribution of BEOG dollars across income categories. This result is largely because of the increase in public four-year funds, together with the fact that all income categories of students at public two-year institutions are faced with a lower grant amount under this program alternative. The level of funding necessary for the BEOG program under this specification decreases by 3% ($380.5 million to $369.3 million) from the funding level estimated for the half cost specification.

Tables 34 and 35 contain estimated BEOG dollar distributions for a number of other alternative program specifications.

It should also be noted that the effects of these BEOG program specifications are not uniform across states. Since the cost of attendance varies dramatically across states, the effective constraint on grant size also varies widely across states. To illustrate these variations, Table 2 (Chapter I) contains the total student cost of attendance and tuition at public four-year and two-year institutions for each state. The total cost figures are "starred" (*) for those cases where the half cost constraint is effective over the $1,400 minus expected parental contribution limit. Seven states have an average total cost of attendance at public four-year institutions that is low enough so that the half cost constraint becomes effective for determining the size of a BEOG award. There are 33 states for which the half cost maximum is the effective constraint on the grant size at public two-year colleges. The resulting variations in BEOG award size are dramatic. For example, low income ($0-$6,000) students at public two-year colleges in the "nonstarred" states listed in Table 2 would receive maximum grants of $1,130. The maximum grant for low income students at public two-year colleges in Mississippi would be $658; in Rhode Island it would be $623.

Given the variations in costs of attendance across states and type of institutions, the alternative maximum grant specifications for the BEOG program are likely to shift the distribution of BEOG funds across states. The estimated impact of changing the $1,400 parameter to $1,600 and of changing the half cost parameter to half gross need on the distribution of BEOG dollars across states is shown in Table 37. The differences in the distributions reflect the institutional mix in each state as well as the BEOG program parameters and the costs of attendance. For example, Mississippi drops .21 percentage points (2.58% to 2.37%) in its share of the total BEOG dollars as the $1,400 parameter is increased to $1,600. Given the extremely low cost of attendance in Mississippi, the BEOG award size is severely limited relative to other states. Rhode Island does not change its share of total BEOG dollars very much as the $1,400 parameter is increased to $1,600, although it has the lowest cost public two-year colleges. However, Rhode Island has a relatively large percentage of enrollment at private and public four-year institutions which are significantly more expensive. These institutional sectors appear to qualify for much larger BEOG awards.

Table 37

STATE DISTRIBUTIONS OF BEOG DOLLARS AND PERCENTAGE OF NATIONAL TOTALS UNDER ALTERNATIVE SPECIFICATIONS OF THE PROGRAM

State	$1,400-EPC and 1/2 Cost	$1,600-EPC and 1/2 Cost	$1,400-EPC and 1/2 Gross Need
Alabama	$ 9,796 (2.61%)	$11,081 (2.61%)	$ 9,357 (2.63%)
Alaska	245 (.06)	292 (.06)	245 (.07)
Arizona	3,069 (.82)	3,406 (.80)	2,795 (.78)
Arkansas	4,583 (1.22)	4,801 (1.13)	3,996 (1.12)
California	34,199 (9.14)	38,747 (9.12)	32,546 (9.15)
Colorado	3,759 (1.00)	4,406 (1.03)	3,668 (1.03)
Connecticut	3,158 (.84)	3,666 (.86)	3,079 (.87)
Delaware	778 (.20)	862 (.20)	720 (.20)
District of Columbia	1,906 (.50)	2,259 (.53)	1,898 (.53)
Florida	10,727 (2.86)	11,977 (2.82)	9,981 (2.80)
Georgia	8,526 (2.27)	9,671 (2.27)	8,256 (2.32)
Hawaii	686 (.18)	730 (.17)	596 (.17)
Idaho	847 (.22)	985 (.23)	744 (.21)
Illinois	17,056 (4.55)	20,138 (4.74)	16,973 (4.77)
Indiana	5,336 (1.42)	6,339 (1.49)	5,291 (1.49)
Iowa	4,998 (1.33)	5,801 (1.36)	4,840 (1.36)
Kansas	4,406 (1.17)	4,967 (1.17)	4,111 (1.16)
Kentucky	5,721 (1.52)	6,188 (1.45)	5,108 (1.44)
Louisiana	9,386 (2.50)	9,785 (2.30)	8,045 (2.26)
Maine	2,377 (.63)	2,816 (.66)	2,340 (.66)
Maryland	5,612 (1.50)	6,508 (1.53)	5,455 (1.53)
Massachusetts	8,622 (2.30)	10,063 (2.37)	8,459 (2.38)
Michigan	13,113 (3.51)	15,410 (3.63)	12,953 (3.64)
Minnesota	6,742 (1.80)	7,803 (1.83)	6,523 (1.83)
Mississippi	9,683 (2.58)	10,086 (2.37)	8,307 (2.33)
Missouri	7,950 (2.12)	9,013 (2.12)	7,580 (2.13)
Montana	1,296 (.34)	1,503 (.35)	1,258 (.35)
Nebraska	2,847 (.76)	3,244 (.76)	2,717 (.76)
Nevada	668 (.17)	783 (.18)	650 (.18)
New Hampshire	1,038 (.27)	1,221 (.28)	1,010 (.28)
New Jersey	10,734 (2.86)	12,390 (2.91)	10,463 (2.94)

Table 37 (Concluded)

State	$1,400-EPC and 1/2 Cost	$1,600-EPC and 1/2 Cost	$1,400-EPC and 1/2 Gross Need
New Mexico	$ 3,556 (.95%)	$ 3,902 (.91%)	$ 3,302 (.93)
New York	43,789 (11.70)	50,158 (11.81)	42,085 (11.83)
North Carolina	13,170 (4.80)	14,766 (3.47)	12,475 (3.51)
North Dakota	1,732 (.63)	1,844 (.43)	1,482 (.42)
Ohio	13,164 (4.80)	15,041 (3.54)	12,629 (3.55)
Oklahoma	6,693 (2.44)	7,397 (1.74)	6,240 (1.75)
Oregon	3,628 (.96)	4,287 (1.00)	3,614 (1.02)
Pennsylvania	19,289 (5.15)	22,637 (5.33)	19,083 (5.36)
Rhode Island	1,614 (.43)	1,888 (.44)	1,520 (.43)
South Carolina	8,385 (2.24)	9,483 (2.23)	7,992 (2.25)
South Dakota	2,139 (.57)	2,399 (.56)	1,982 (.56)
Tennessee	7,882 (2.10)	8,834 (2.08)	7,449 (2.09)
Texas	25,718 (6.87)	27,787 (6.54)	23,292 (6.55)
Utah	1,192 (.31)	1,409 (.33)	1,181 (.33)
Vermont	958 (.25)	1,148 (.27)	959 (.27)
Virginia	7,385 (1.97)	8,483 (1.99)	7,212 (2.03)
Washington	4,337 (1.15)	4,995 (1.17)	4,160 (1.17)
West Virginia	2,647 (.70)	2,872 (.67)	2,374 (.67)
Wisconsin	6,439 (1.72)	7,654 (1.80)	6,409 (1.80)
Wyoming	482 (.12)	533 (.12)	436 (.12)

Source: SRI.

The College Work Study Program: An Analysis of Alternative Institutional Matching Requirements

The purpose of this analysis is to examine the likely impact in terms of the distribution of aid dollars from changing the matching requirements of the CWS program to 60% federal/40% institutional funds. The CWS program is currently operating on the basis of 80% federal/20% institutional funds.

The basic national data used for the analysis are shown in Table 21 (Chapter III) for the four basic categories of institutions. The institutional aid data are from the Tripartite Application Forms, Office of Education, DHEW, and represent the total amount of student aid funds that the institutions have available from their own sources for distribution. Since a large portion of these funds is targeted to very specific types of students, they are not available for matching purposes with federal funds. The best available estimates of the percentage of institutional student aid funds generally available for matching purposes are from a survey conducted by Jerry Davis* on 100 colleges and universities. The second footnote for Table 21 more completely describes these percentages.

The remaining columns in Table 21 trace through the calculations of the amount of institutional student aid that is not currently (1972-73) being used to match NDSL (at 10%) and CWS (at 20%) funds. The results given in the "Unmatched Institutional Aid" column indicate that nationally for all of the institutional categories, there are sufficient institutional funds to match the 60% federal/40% institutional funds for the

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*Davis, J., Student Financial Aid Needs and Resources in the SREB, States: A Comparative Analysis, Southern Regional Education Board, Atlanta, Georgia (1973).

1972-73 level of CWS. In fact, from the national aggregate data in Table 21, the institutional matching requirement could increase from 20% to 52% before the public two-year category of institutions would be constrained by the availability of institutional student aid funds. The 52% results from the following calculation: 20% + [(18, 478/57,103) × 100]. These numbers are taken from Table 21.

This national aggregate picture is useful for illustrating the basic procedure for analyzing the relationship between institutional aid and CWS matching requirements, but it is somewhat misleading. Substantial variations exist across states by categories of institutions in the availability of institutional student aid funds for matching purposes. These variations are illustrated in Table 38 for each state. The public two-year institutions in the 11 states listed below are already very close to matching all their institutional student aid with federal CWS and NDSL funds.

Alabama
Delaware
Minnesota
Nevada
Missouri
Ohio
Oklahoma
Pennsylvania
Utah
Virginia
West Virginia

Private two-year institutions in several states are also at or close to their limits for matching CWS and NDSL funds. As the matching requirement percentage is raised, additional states will reach their limit in the amount of federal CWS funds that they can use in their public two-year colleges. When the percentage for matching institutional aid reaches 40%, the public two-year institutions in 25 states will be constrained by their level of institutional aid available for matching. These states are indicated by a single dagger (†) in the far right column of Table 38.

Table 38

STATE DATA ON MATCHING FUNDS AND REQUIREMENTS BY INSTITUTIONAL CATEGORY 1972-1973

State	Institutional Category	Thousands of Dollars					FTE Undergraduate Enrollment	UA/ FTE in Dollars
		SEOG	CWS	NDSL	Institutional Aid	Unmatched Aid*		
Alabama	Pub 4	$1,362	$ 3,249	$ 3,145	$ 7,179	$ 3,415	53,152	$ 64
	Pub 2	208	1,024	143	433	62.4	14,364	4.3†
	Pri 4	1,632	2,345	1,936	3,782	1,493	12,373	121
	Pri 2	46	183	393	234	78.5	1,313	60
Alaska	Pub 4	33	130	44	351	184	2,294	80.2
	Pub 2	6	0	19	20	11	2,803	3.9
	Pri 4	51	146	206	279	109	593	183.8
	Pri 2	0	0	0	47	31	164	189.0
Arizona	Pub 4	885	1,187	3,108	8,494	4,635	39,490	117.4
	Pub 2	623	1,035	767	10,271	6,392	20,140	317.4
	Pri 4	59	31	277	573	293	980	298.9
	Pri 2	27	82	21	120	61	397	153.6
Arkansas	Pub 4	1,032	2,700	2,650	3,508	1,335	33,091	40.3
	Pub 2	21	70	20	85	39	1,637	23.8
	Pri 4	459	915	1,030	1,280	444	7,014	63.3
	Pri 2	135	220	119	158	48	504	95.2
California	Pub 4	8,745	10,573	21,438	41,344	20,955	270,782	77.4
	Pub 2	4,856	8,839	4,148	10,558	4,680	288,208	16
	Pri 4	2,783	3,299	14,044	36,237	28,591	73,661	252.4
	Pri 2	144	201	158	629	359	717	500.7
Colorado	Pub 4	1,941	2,730	5,582	18,588	10,235	60,816	168.3
	Pub 2	464	690	[illegible]	1,717	937	6,963	134.6
	Pri 4	208	196	1,184	6,893	3,772	10,581	356.5
	Pri 2	0	0	0	0	0	39	0

Table 38 (Continued)

State	Institutional Category	Thousands of Dollars SEOG	CWS	NDSL	Institutional Aid	Unmatched Aid*	FTE Undergraduate Enrollment	UA/ FTE in Dollars
Connecticut	Pub 4	$1,210	$ 1,583	$ 2,075	$ 3,613	$ 1,679	32,602	$ 51.5
	Pub 2	224	388	185	268	77	18,987	4.0†
	Pri 4	1,020	1,282	3,584	15,178	7,576	28,493	261.7
	Pri 2	54	84.	86	228	124	1,523	81.4
Delaware	Pub 4	347	452	625	2,996	1,675	12,229	136.9
	Pub 2	56	105	111	53	2	1,144	1.7†
	Pri 4	10	19	46	0	-9	388	-23.2
	Pri 2	60	65	343	238	110	2,224	49.5
District of Columbia	Pub 4	714	493	589	452	118	5,154	22.9
	Pub 2	205	257	124	436	220	3,090	71.2
	Pri 4	513	706	2,756	12,587	6,883	26,363	261.1
	Pri 2	2	12	0	9	3	581	5.2
Florida	Pub 4	1,884	2,400	5,252	13,197	7,477	65,291	114.5
	Pub 2	1,101	3,720	970	3,545	1,463	59,405	24.6
	Pri 4	1,513	2,278	5,229	17,007	8,715	31,634	275.5
	Pri 2	14	18	134	18	-5	900	-5.6
Georgia	Pub 4	1,127	2,787	3,088	6,256	2,950	59,717	49.4
	Pub 2	246	834	330	516	135	15,075	8.9†
	Pri 4	1,969	2,615	3,455	6,997	3,119	17,112	182.2
	Pri 2	81	192	236	289	129	2,027	63.6
Hawaii	Pub 4	245	536	538	2,499	878	17,147	51.2
	Pub 2	145	307	161	193	48	4,532	10.6†
	Pri 4	111	113	125	173	64	2,442	26.2
	Pri 2	--	--	--	--	--	--	--
Idaho	Pub 4	363	788	1,082	3,150	1,656	15,818	104.7
	Pub 2	126	278	158	144	22	1,831	12.0†
	Pri 4	197	139	325	607	285	1,720	165.7
	Pri 2	0	0	0	0	0	4,959	0

Table 38 (Continued)

State	Institutional Category	Thousands of Dollars SEOG	CWS	NDSL	Institutional Aid	Unmatched Aid*	FTE Undergraduate Enrollment	UA/ FTE in Dollars
Illinois	Pub 4	$3,994	$ 4,262	$ 8,871	$27,514	$15,044	126,761	$ 118.7
	Pub 2	2,261	4,825	1,272	2,082	261	61,071	4.3†
	Pri 4	3,421	2,464	12,350	33,195	17,193	70,914	242.5
	Pri 2	497	1,345	260	444	-2	5,278	-0.4
Indiana	Pub 4	2,558	3,292	7,805	25,481	14,104	89,909	156.9
	Pub 2	115	441	122	227	48	1,503	31.9†
	Pri 4	1,782	2,249	4,308	11,055	5,420	38,715	139.9
	Pri 2	8	87	14	8	-13	315	-41.3
Iowa	Pub 4	1,056	2,061	3,443	8,976	4,718	35,648	132.3
	Pub 2	316	855	554	170	-115	9,293	-12.4†
	Pri 4	1,775	2,178	5,086	11,520	5,621	28,541	196.9
	Pri 2	92	128	112	268	138	2,115	65.2
Kansas	Pub 4	1,482	1,975	4,580	12,426	6,726	50,548	133.1
	Pub 2	409	797	376	788	315	14,264	22.1
	Pri 4	817	736	2,047	3,510	1,649	10,225	161.3
	Pri 2	95	81	125	274	152	1,193	127.4
Kentucky	Pub 4	1,512	3,241	4,782	7,834	4,236	52,795	80.2
	Pub 2	--	--	--	--	--	--	--
	Pri 4	799	2,073	2,054	8,116	4,006	13,109	305.6
	Pri 2	282	542	212	876	449	1,510	297.3
Louisiana	Pub 4	2,310	5,528	4,416	6,751	2,571	80,722	31.9
	Pub 2	67	179	48	133	45	5,929	3.9
	Pri 4	1,156	1,180	2,701	5,144	2,426	11,327	214.2
	Pri 2	--	--	--	--	--	--	--
Maine	Pub 4	431	1,132	1,372	2,274	1,024	14,430	71.0
	Pub 2	5	16	42	35	16	1,076	14.9
	Pri 4	249	146	493	2,206	1,179	8,279	142.4
	Pri 2	0	0	0.4	1.4	1	226	4.4

Table 38 (Continued)

State	Institutional Category	Thousands of Dollars					FTE Undergraduate Enrollment	UA/ FTE in Dollars
		SEOG	CWS	NDSL	Institutional Aid	Unmatched Aid*		
Maryland	Pub 4	$2,003	$ 2,767	$ 3,644	$ 8,048	$ 3,992	53,014	$ 75.3
	Pub 2	291	720	374	609	215	20,217	10.6
	Pri 4	539	628	2,249	7,813	4,102	14,815	276.9
	Pri 2	34	169	255	26	-43	361	-119.1
Massachusetts	Pub 4	593	964	576	5,253	2,953	62,040	47.6
	Pub 2	208	626	255	445	138	16,545	8.3
	Pri 4	4,084	6,576	13,273	51,508	26,718	106,883	249.9
	Pri 2	208	264	674	1,199	671	9,963	67.3
Michigan	Pub 4	4,738	6,699	13,584	27,336	13,977	144,231	96.9
	Pub 2	1,188	2,749	2,017	2,140	639	49,440	12.9
	Pri 4	2,352	1,558	3,587	8,296	4,058	34,816	116.6
	Pri 2	135	243	242	3,020	1,920	2,342	819.8
Minnesota	Pub 4	2,539	3,971	6,658	11,175	5,357	65,478	81.8
	Pub 2	332	777	459	383	48	17,884	2.7†
	Pri 4	1,609	1,108	3,983	9,882	5,014	25,936	193.3
	Pri 2	44	24	124	234	137	593	231.0
Mississippi	Pub 4	1,556	3,264	3,974	7,896	3,768	35,610	105.8
	Pub 2	248	1,208	225	726	207	15,869	13.0†
	Pri 4	532	1,065	805	1,239	412	5,830	70.7
	Pri 2	179	578	176	256	35	1,464	23.9
Missouri	Pub 4	2,039	3,267	4,981	8,754	4,189	72,744	57.6
	Pub 2	423	1,596	664	198	-256	12,762	-20.1†
	Pri 4	1,472	1,769	5,231	15,773	-764	28,135	-27.2
	Pri 2	63	207	81	556	318	1,994	159.5
Montana	Pub 4	582	1,852	1,364	3,752	1,783	18,865	10.6
	Pub 2	68	119	32	879	459	1,057	434
	Pri 4	206	285	456	5,616	2,582	1,976	1.3
	Pri 2	--	--	--	--	--	--	--

Table 38 (Continued)

State	Institutional Category	Thousands of Dollars					FTE Undergraduate Enrollment	UA/ FTE in Dollars
		SEOG	CWS	NDSL	Institutional Aid	Unmatched Aid*		
Nebraska	Pub 4	$1,031	$ 1,568	$ 1,932	$ 3,815	$ 1,631	33,276	$ 49.0
	Pub 2	48	255	60	176	45	2,511	17.9†
	Pri 4	551	446	1,748	4,010	1,796	10,381	174.7
	Pri 2	61	30	114	124	64	318	201.2
Nevada	Pub 4	168	354	558	2,567	1,237	8,315	148.8
	Pub 2	18	22	32	0	-4	507	-7.9†
	Pri 4	0	0	28	11	5	83	60.2
	Pri 2	--	--	--	--	--	--	--
New Hampshire	Pub 4	415	546	738	3,112	1,478	12,513	118.1
	Pub 2	2	29	17	20	5	410	12.2†
	Pri 4	461	475	1,316	5,470	2,476	11,437	216.5
	Pri 2	27	29	41	31	11	437	25.2
New Jersey	Pub 4	2,576	2,923	3,491	3,397	1,138	70,390	16.2
	Pub 2	655	1,322	617	702	130	23,127	5.6†
	Pri 4	1,083	2,106	3,065	12,680	21,193	38,458	551.1
	Pri 2	34	78	51	267	155	3,711	41.8
New Mexico	Pub 4	908	1,851	2,130	3,496	1,833	26,171	70.1
	Pub 2	56	142	79	200	94	2,347	40.1
	Pri 4	254	239	430	386	129	2,522	51.1
	Pri 2	--	--	--	--	---	--	--
New York	Pub 4	9,196	12,603	12,371	22,793	10,124	180,063	56.2
	Pub 2	1,988	2,562	2,477	2,982	1,178	152,889	7.7
	Pri 4	6,489	7,504	21,473	69,576	37,360	182,638	204.6
	Pri 2	111	278	366	961	541	6,162	87.8
North Carolina	Pub 4	2,331	5,173	5,839	14,573	7,270	68,202	106.6
	Pub 2	200	969	162	512	123	10,127	12.1†
	Pri 4	1,990	3,360	4,426	7,732	3,292	34,977	94.1
	Pri 2	235	461	609	678	294	6,671	44.1

Table 38 (Continued)

State	Institutional Category	Thousands of Dollars SEOG	CWS	NDSL	Institutional Aid	Unmatched Aid*	FTE Undergraduate Enrollment	UA/ FTE in Dollars
North Dakota	Pub 4	$ 713	$ 1,039	$ 2,151	$ 2,604	$ 1,165	17,394	$ 67.0
	Pub 2	111	224	154	192	65	3,661	17.8
	Pri 4	249	237	248	89	-67	1,246	-53.8
	Pri 2	--	--	--	--	--	--	--
Ohio	Pub 4	3,541	5,369	8,885	23,[illegible]1	12,270	158,442	77.4
	Pub 2	946	1,252	2,168	167	-542	26,338	-20.6[†]
	Pri 4	4,188	5,805	9,201	23,940	10,886	69,352	157.0
	Pri 2	30	137	158	217	95	1,175	80.9
Oklahoma	Pub 4	1,513	2,716	4,647	13,869	7,452	58,459	127.5
	Pub 2	864	1,162	1,232	622	49	13,069	3.8[†]
	Pri 4	524	342	1,398	3,736	1,921	11,703	164.1
	Pri 2	96	111	147	280	148	2,035	72.7
Oregon	Pub 4	1,207	1,683	2,917	9,156	4,956	42,241	117.3
	Pub 2	632	996	781	832	264	11,434	23.1
	Pri 4	613	539	1,417	3,844	1,941	10,370	187.2
	Pri 2	7	7	20	67	40	301	132.9
Pennsylvania	Pub 4	3,965	6,258	8,555	14,070	6,475	116,040	55.8
	Pub 2	621	1,282	759	505	-4	30,827	-0.1[†]
	Pri 4	4,452	6,180	13,191	27,492	13,115	117,036	112.1
	Pri 2	200	204	359	257	93	4,048	22.9
Rhode Island	Pub 4	294	692	1,024	1,911	926	12,863	72.0
	Pub 2	0	0	0	88	57	2,411	23.6
	Pri 4	692	909	1,876	10,835	5,806	15,979	363.3
	Pri 2	--	--	--	--	--	--	--
South Carolina	Pub 4	366	1,189	1,461	5,052	2,698	31,462	85.7
	Pub 2	72	521	57	453	184	9,525	19.3
	Pri 4	1,293	2,430	1,886	2,408	698	16,731	41.7
	Pri 2	192	420	349	477	196	3,216	60.9

Table 38 (Continued)

State	Institutional Category	Thousands of Dollars: SEOG	CWS	NDSL	Institutional Aid	Unmatched Aid*	FTE Undergraduate Enrollment	UA/ FTE in Dollars
South Dakota	Pub 4	$ 582	$ 1,236	$ 1,442	$ 2,538	$ 1,157	16,989	$ 68.1
	Pub 2	--	--	--	--	--	--	--
	Pri 4	563	525	980	1,629	725	5,100	142.2
	Pri 2	17	11	43	59	33	352	93.8
Tennessee	Pub 4	1,507	3,425	3,216	7,396	3,504	66,600	5.3
	Pub 2	154	421	195	144	-10	7,996	-1.3†
	Pri 4	1,869	2,947	4,593	9,252	4,226	27,981	151.0
	Pri 2	248	302	643	520	219	2,551	85.8
Texas	Pub 4	3,879	6,866	5,720	31,498	17,269	187,831	91.9
	Pub 2	1,306	3,997	711	1,933	386	70,273	5.5†
	Pri 4	4,365	5,975	10,125	21,076	9,805	51,939	188.8
	Pri 2	85	118	137	287	-61	3,621	-16.8
Utah	Pub 4	1,376	1,689	2,819	5,401	2,675	30,800	86.9
	Pub 2	205	227	269	450	-188	2,031	-92.6†
	Pri 4	55	10	105	165	81	23,461	3.5
	Pri 2	--	--	--	--	--	--	--
Vermont	Pub 4	194	196	692	3,696	2,146	9,180	233.8
	Pub 2	52	36	0	63	34	472	72.0
	Pri 4	175	243	376	2,117	1,121	8,286	135.3
	Pri 2	52	83	119	116	49	1,247	39.3
Virginia	Pub 4	1,518	26,256	12,019	8,314	-1,381	65,818	-21.0
	Pub 2	479	1,607	216	304	-145	9,094	-15.9†
	Pri 4	1,136	2,007	3,207	4,639	1,922	20,945	91.8
	Pri 2	82	130	154	271	138	2,608	52.9
Washington	Pub 4	1,194	1,578	4,038	10,201	5,503	56,718	97.0
	Pub 2	881	1,830	666	2,014	876	36,231	24.2
	Pri 4	796	608	2,835	5,468	2,711	16,046	168.9
	Pri 2	--	--	--	--	--	--	--

Table 38 (Concluded)

State	Institutional Category	Thousands of Dollars					FTE Undergraduate Enrollment	UA/ FTE in Dollars
		SEOG	CWS	NDSL	Institutional Aid	Unmatched Aid*		
West Virginia	Pub 4	$1,310	$ 2,684	$ 2,599	$ 5,430	$ 2,515	34,115	$ 73.7
	Pub 2	71	156	101	76	8	2,190	3.7[†]
	Pri 4	382	636	1,437	2,083	916	7,893	116.1
	Pri 2	41	43	51	96	48	756	63.5
Wisconsin	Pub 4	4,640	5,285	9,149	11,156	4,833	94,278	51.3
	Pub 2	312	728	52	546	204	9,244	22.1
	Pri 4	735	478	1,961	6,707	3,531	22,328	158.2
	Pri 2	4	10	19	73	44	353	124.6
Wyoming	Pub 4	410	347	803	4,396	2,536	6,623	382.9
	Pub 2	77	214	133	296	136	2,943	46.2
	Pri 4	--	--	--	--	--	--	--
	Pri 2	--	--	--	--	--	--	--

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[*] Unmatched aid = [(proportion available) × (institutional aid)] - [(NDSL × (.10)] - [CWS × (.20)]
where (proportion available) = .61 for public four-year
= .65 for public two-year
= .57 for private four-year
= .66 for private two-year.

[†] Denotes states where the public two-year colleges would not have sufficient institutional aid funds to match federal CWS funds at 40%.

Source: SRI.

Obviously, these matching fund constraints will alter the distribution of CWS funds by types of institutions and indirectly will change the distribution of CWS funds across income categories. Simulations of the CWS program at a funding level of $278 million under alternative matching requirements ranging from 20% to 60% in 20% increments were undertaken for each state separately, and then the results were aggregated into national distributions of CWS funds across institutional categories and across family income categories. The resulting distributions are illustrated in Tables 39 and 40. As evident from Table 21 as well, the public (and private) two-year institutions are constrained the most by increased matching requirements for CWS funds. The amount of federal CWS dollars going to public two-year colleges would decrease by approximately 9% [(17.6%-16.1%)/17.6%] if the matching requirement were increased to 40%, while the private four-year institutions could increase their amount of CWS funds by approximately 2% [(33.2%-32.5%)/32.5%]. This latter increase assumes that the private four-year institutions would seek additional, available CWS money even though the matching requirement was increased.

As shown in Table 40, the estimated distribution of CWS dollars across income categories does not change very much as the matching requirement is increased. Since the program remains a need-based program regardless of the matching fund requirement, it is not expected that the income distribution should change very much.

To illustrate better the detailed data presented by state in Table 38, the distributions by state of CWS dollars under alternative matching fund requirements are given in Table 41. As expected from the information in Table 38, states with a substantial portion of their enrollment in public two-year colleges and with limited amounts of institutional aid are estimated to have significantly smaller percentages of the total

Table 39

ESTIMATED DISTRIBUTIONS OF COLLEGE WORK STUDY DOLLARS BY CATEGORIES OF INSTITUTIONS FOR ALTERNATIVE MATCHING FUND REQUIREMENTS

Matching Requirement	Percentage of Total CWS Dollars			
	Public 4-Year	Public 2-Year	Private 4-Year	Private 2-Year
20%	46.9%	17.6%	32.5%	3.0%
40%	48.1	16.1	33.2	2.6
60%	49.6	14.0	34.0	2.4

Source: SRI

Table 40

ESTIMATED DISTRIBUTIONS OF COLLEGE WORK STUDY DOLLARS BY FAMILY INCOME CATEGORIES FOR ALTERNATIVE MATCHING FUND REQUIREMENTS

Matching Requirement	Percentage of Total CWS Dollars			
	$0-6,000	$6,000-9,000	$9,000-12,000	$12,000+
20%	51.5%	29.2%	13.4%	5.9%
40%	51.4	29.1	13.5	6.0
60%	51.2	29.0	13.6	6.2

Source: SRI.

Table 41

PERCENTAGE DISTRIBUTION BY STATE OF COLLEGE WORK STUDY ALTERNATIVE MATCHING FUND REQUIREMENTS

State	Institutional CWS Matching Requirement		
	20%	40%	60%
Alabama	2.77%	2.54%	2.46%
Alaska	.14	.14	.14
Arizona	.94	.97	1.03
Arkansas	1.51	1.49	1.47
California	7.71	7.93	8.17
Colorado	1.24	1.27	1.31
Connecticut	1.11	1.15	1.08
Delaware	.27	.25	.24
District of Columbia	.71	.66	.55
Florida	3.34	3.44	3.21
Georgia	3.09	2.88	2.79
Hawaii	.29	.28	.25
Idaho	.33	.31	.29
Illinois	3.67	3.43	3.24
Indiana	1.86	1.92	1.83
Iowa	1.70	1.62	1.60
Kansas	1.39	1.43	1.38
Kentucky	2.43	2.50	2.58
Louisiana	2.45	2.41	2.39
Maine	.56	.56	.56
Maryland	1.50	1.54	1.48
Massachusetts	3.46	3.43	3.35
Michigan	3.88	3.73	3.35
Minnesota	2.13	2.07	2.01

Table 41 (Concluded)

State	Institutional CWS Matching Requirement		
	20%	40%	60%
Mississippi	2.38%	2.16%	1.99%
Missouri	2.28	2.28	2.24
Montana	.77	.79	.77
Nebraska	.93	.95	.90
Nevada	.11	.11	.11
New Hampshire	.37	.38	.39
New Jersey	2.08	1.96	1.84
New Mexico	.52	.53	.55
New York	5.08	5.22	5.38
North Carolina	4.33	4.20	4.05
North Dakota	.37	.34	.31
Ohio	4.05	3.97	3.94
Oklahoma	1.48	1.52	1.39
Oregon	1.44	1.48	1.40
Pennsylvania	5.11	5.04	4.95
Rhode Island	.49	.49	.52
South Carolina	1.73	1.71	1.41
South Dakota	.60	.62	.63
Tennessee	2.94	2.90	2.88
Texas	6.32	6.15	5.80
Utah	.74	.76	.79
Vermont	.33	.34	.35
Virginia	2.06	1.89	1.84
Washington	1.65	1.69	1.75
West Virginia	1.30	1.27	1.26
Wisconsin	1.17	1.21	1.24
Wyoming	.17	.17	.18

Source: SRI.

CWS dollars as the matching requirement is increased. Examples of states in this category are Alabama, Georgia, and Mississippi.

The SEOG Program: An Analysis of Alternative State Allocation Formulas

The purpose of this analysis is to estimate the distribution of funds for the SEOG program with alternative state allocation rules imposed, as described in Chapter III. To illustrate the impact of alternative state allocation rules on the distribution of student aid funds (in this example from the SEOG program) across family income and institutional categories, the following procedure was undertaken for each distribution formula: First, the SEOG dollars ($210 million) were distributed by formula to each of the states. Second, for each state, the SEOG dollars were distributed across income and institutional categories on the basis of the actual 1972-73 distribution. Third, these state distributions by family income and institutional categories were aggregated to the national level. The resulting national distributions by institutional categories are shown in Table 42, and the national distributions by family income categories are given in Table 43.

The state distributions of SEOG dollars resulting from the two new allocation rules (gross need and need less tuition) are shown in Table 7 in Chapter III. The national distributions of SEOG Dollars across family income and institutional categories are given in Tables 42 and 43. It is interesting that with the great variations in tuition levels and types of institutions across states, the allocations to states with the "gross need" and "need less tuition" procedures are significantly different. Massachusetts is an extreme illustration of this point. Under the "gross need" distribution, Massachusetts would receive 4.85% of the SEOG dollars, while under the "need less tuition" distribution Massachusetts would receive only 2.92%.

Table 42

ESTIMATED DISTRIBUTIONS OF SEOG DOLLARS BY CATEGORIES OF INSTITUTIONS FOR ALTERNATIVE STATE ALLOCATION FORMULAS

Allocation Formula	Percentage of Total SEOG Dollars			
	Public 4-Year	Public 2-Year	Private 4-Year	Private 2-Year
FTE[*]	41.5%	21.5%	33.6%	3.4%
Three factors[†]	42.1	19.7	34.7	3.5
Gross need[‡]	41.0	21.5	34.2	3.3
Need less tuition[§]	41.7	23.7	31.6	3.0

---

[*] State allocation based on the number of FTE undergraduates enrolled

[†] State allocation based on 1/3 the number of full-time undergraduates enrolled + 1/3 the number of high school graduates + 1/3 the number of 14- to 17-year-olds from families with incomes less than $6,000.

[‡] State allocation based on gross need (total student budget minus expected parental contribution).

[§] State allocation based on need less tuition (total student budget minus tuition and expected parental contribution). Need less tuition equals gross need minus tuition.

Source: SRI.

Table 43

ESTIMATED DISTRIBUTIONS OF SEOG DOLLARS BY FAMILY INCOME CATEGORIES FOR ALTERNATIVE STATE ALLOCATION FORMULAS

Allocation Formula	Percentage of Total SEOG Dollars			
	$0-6,000	$6,000-9,000	$9,000-12,000	$12,000 +
FTE[*]	72.4%	27.6%	--%	--%
Three factors[†]	73.1	26.9	--	--
Gross need[‡]	71.9	28.1	--	--
Need less tuition[§]	72.6	27.4	--	--

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[*] State allocation based on the number of FTE undergraduates enrolled.

[†] State allocation based on 1/3 the number of full-time undergraduates enrolled + 1/3 the number of high school graduates + 1/3 the number of 14- to 17-year-olds from families with incomes less than $6,000.

[‡] State allocation based on gross need (total student budget minus expected parental contribution).

[§] State allocation based on need less tuition (total student budget minus tuition and expected parental contribution). Need less tuition equals gross need minus tuition.

Source: SRI.

It is somewhat surprising to note in Tables 42 and 43 that the national aggregate income and institutional distributions do not change very much under these alternative state allocation procedures. Since the _within_ distributions are the same regardless of the _between_ state distribution process and since a variety of factors influence the between state distribution (income distribution of the population, enrollment levels, tuition changes, total student budgets, college participation rates), the different distributions across income and institutions within states are averaged out when aggregated to the national level.

The SEOG Program: An Analysis of Alternative Grant Maximums per Recipient

As a means of rationing student aid funds so that a larger number of students may receive some financial assistance, limits on the amount any student may receive have been specified in the design of student aid programs. For the current SEOG program, the maximum grant that may be a awarded to a student is $1,500. Since the specification of grant maximums is one of the policy parameters that the federal government can use to influence the distribution of student aid funds, this analysis is designed to examine the likely effects of alternative grant maximums for the SEOG program on the aid distribution by state, family income, and institutional categories.

The approach used to estimate the distribution of SEOG dollars with alternative maximum grant specifications was to simulate for each state the distribution of aid on the basis of financial need, institutional preferences and competition for SEOG dollars, and student preferences for SEOG assistance. The simulation procedure also imposes constraints on the amount of the grant that any one student may receive. The simulated distributions of SEOG dollars across family income and institutional categories for each state were then aggregated to give the estimated national distribution shown in Tables 44 and 45.

As expected, by increasing the maximum grant per recipient, the percentage of SEOG dollars going to private four-year institutions increases significantly (from 25.6% to 32.4% as the maximum increases from $1,000 to $2,000), while the percentage going to public colleges and universities declines. The higher cost of attendance at the private institutions leads to higher levels of financial need which leads to larger grants that are need-based (such as SEOG). The maximum grant specification, however, limits the percentage of financial need that would be met on the basis of need only.

Table 44

ESTIMATED DISTRIBUTIONS OF SEOG DOLLARS BY CATEGORIES OF INSTITUTIONS FOR ALTERNATIVE MAXIMUM GRANTS PER RECIPIENT

Maximum Grant per Recipient	Percentage of Total SEOG Dollars			
	Public 4-Year	Public 2-Year	Private 4-Year	Private 2-Year
$1,000	49.6%	22.7%	25.6%	2.1%
$1,500	46.2	20.5	30.8	2.5
$2,000	44.9	20.1	32.4	2.5

Source: SRI.

Table 45

ESTIMATED DISTRIBUTIONS OF SEOG DOLLARS BY FAMILY INCOME CATEGORIES FOR ALTERNATIVE MAXIMUM GRANTS PER RECIPIENT

Maximum Grant per Recipient	Percentage of Total SEOG Dollars			
	$0-6,000	$6,000-9,000	$9,000-12,000	$12,000 +
$1,000	67.0%	33.0%	--%	--%
$1,500	70.8	29.2	--	-- --
$2,000	71.5	28.5	--	-- --

Source: SRI.

It is interesting to note in Table 45 that increasing the maximum grant per recipient leads to an increased percentage of the SEOG dollars being distributed to the lowest family income category of students ($0-$6,000). These students have the greatest need for financial assistance, but the maximum grant specifications limit the percentage of their need that can be met relative to the other, higher income categories.

Given the differences across states in the income distribution of students, the costs of attendance, and the institutional mix, the alternative maximum grant specifications for the SEOG program are estimated to result in different distributions of SEOG dollars across states. These state distributions are shown in Table 46.

Table 46

STATE DISTRIBUTIONS OF SEOG DOLLARS AND PERCENTAGE OF NATIONAL TOTALS UNDER ALTERNATIVE MAXIMUM GRANTS PER RECIPIENT

	Maximum Grant per Recipient		
State	$1,000	$1,500	$2,000
Alabama	$ 3,571 (1.85%)	$ 3,813 (1.88%)	$ 3,679 (1.83%)
Alaska	175 (.09)	195 (.10)	191 (.09)
Arizona	2,345 (1.21)	2,208 (1.09)	2,161 (1.07)
Arkansas	1,702 (.88)	1,581 (.78)	1,527 (.76)
California	24,842 (12.85)	23,500 (11.58)	22,620 (11.23)
Colorado	3,418 (1.77)	3,389 (1.67)	3,279 (1.63)
Connecticut	2,506 (1.30)	2,785 (1.37)	2,876 (1.43)
Delaware	510 (.26)	563 (.28)	562 (.28)
District of Columbia	1,287 (.67)	1,537 (.76)	1,522 (.76)
Florida	6,033 (3.12)	6,008 (2.96)	6,165 (3.06)
Georgia	3,361 (1.74)	3,651 (1.80)	3,816 (1.89)
Hawaii	795 (.41)	743 (.37)	723 (.36)
Idaho	881 (.46)	866 (.43)	847 (.42)
Illinois	9,293 (4.81)	11,350 (5.59)	11,006 (5.46)
Indiana	4,394 (2.27)	5,093 (2.51)	5,149 (2.56)
Iowa	3,042 (1.57)	3,612 (1.78)	3,751 (1.86)
Kansas	3,119 (1.61)	3,096 (1.52)	3,018 (1.50)
Kentucky	2,823 (1.46)	2,729 (1.34)	2,631 (1.31)
Louisiana	2,783 (1.44)	2,906 (1.43)	2,985 (1.48)
Maine	1,056 (.55)	1,033 (.51)	996 (.49)
Maryland	3,220 (1.67)	3,653 (1.80)	3,588 (1.78)
Massachusetts	6,413 (3.32)	7,291 (3.59)	7,151 (3.55)
Michigan	9,027 (4.67)	9,655 (4.76)	9,538 (4.73)
Minnesota	4,618 (2.39)	5,040 (2.48)	5,000 (2.48)
Mississippi	2,867 (1.48)	2,757 (1.36)	2,683 (1.33)
Missouri	4,531 (2.34)	4,804 (2.37)	4,946 (2.46)
Montana	1,108 (.57)	1,032 (.51)	1,001 (.50)
Nebraska	1,812 (.94)	1,949 (.96)	1,883 (.93)
Nevada	224 (.12)	291 (.14)	281 (.14)
New Hampshire	816 (.42)	980 (.48)	1,041 (.52)
New Jersey	3,503 (1.81)	3,545 (1.75)	3,442 (1.71)

Table 46 (Concluded)

State	$1,000	$1,500	$2,000
New Mexico	$ 1,001 (.52)	$ 920 (.45)	$ 88[illegible] (.44)
New York	14,358 (7.43)	15,124 (7.45)	14,593 (7.24)
North Carolina	5,280 (2.73)	6,021 (2.97)	5,906 (2.93)
North Dakota	975 (.50)	936 (.46)	913 (.45)
Ohio	7,796 (4.03)	8,105 (3.99)	8,442 (4.19)
Oklahoma	2,744 (1.42)	2,632 (1.30)	2,561 (1.27)
Oregon	2,657 (1.37)	3,287 (1.62)	3,260 (1.62)
Pennsylvania	8,025 (4.15)	8,497 (4.19)	8,942 (4.44)
Rhode Island	704 (.36)	869 (.43)	960 (.48)
South Carolina	1,781 (.92)	2,142 (1.06)	2,116 (1.05)
South Dakota	836 (.43)	956 (.47)	956 (.47)
Tennessee	3,530 (1.83)	3,713 (1.83)	3,769 (1.87)
Texas	11,369 (5.88)	11,476 (5.65)	11,680 (5.80)
Utah	1,780 (.92)	2,008 (.99)	1,933 (.96)
Vermont	679 (.35)	943 (.46)	962 (.48)
Virginia	3,376 (1.75)	3,396 (1.67)	3,284 (1.63)
Washington	4,180 (2.16)	4,043 (1.99)	4,016 (1.99)
West Virginia	1,962 (1.02)	2,110 (1.04)	2,099 (1.04)
Wisconsin	3,656 (1.89)	3,601 (1.77)	3,529 (1.75)
Wyoming	508 (.26)	585 (.29)	582 (.29)

Source: SRI.

Summary of the Model as a Policy Analysis Tool

The preceding four analyses of Federal Student Aid program modifications have attempted to illustrate the policy analyses capabilities of the flow of funds model. The level of disaggregation upon which the model is based provides a detailed examination of the likely impacts of modified student aid programs on the flow of aid across states, categories of institutions and types of students. The model provides a means of effectively organizing the massive quantity of data that is currently available on the distribution of student aid in a way that is useful for policy analysis.

As more data and research results that are relevant for student aid analysis becomes available, a comprehensive framework will be needed to organize all of the information so that policy questions can be critically analyzed in sufficient detail to provide useful policy information. The flow of funds model developed and illustrated in this report is an example of one approach to such a policy analysis tool.